DRAGON USER



The independent Dragon magazine

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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

Contents



Editorial

MSX HAS BEEN the subject of considerable publicity in recent months. A host of well-known names such as Toshiba, Sanyo and Spectravideo have pledged their support to the MSX standard which allows software written for one machine to run on all other MSX compatible machines. Software companies too have generally been in favour of the new standard, though most of them are still waiting to see how the machines actually sell.

In an attempt to gather more support to the MSX banner, the MSX working party organised a recent junket to the south of France to officially launch their range of micros. Unfortunately, this trip was timed to coincide with the first day of the Personal Computer World show, a clash which should not have been difficult to avoid.

Those people opposed to MSX cite its Z80, 8-bit, processor as being old-fashioned and out-of-date, to say nothing of being too expensive. Adherents to the MSX ideal wax lyrical about the advantages of software and hardware compatibility. In reality, MSX is probably neither as bad nor as wonderful as it is painted. Whether it succeeds or fails will depend as much on the skill with which it is marketed as on its own merits.

The relevance of all this to Dragon is that Eurohard appears to have acquired a licence to produce an MSX machine. Given that Eurohard is now manufacturing Dragons in Spain, this implies that future Dragons may be based upon the MSX standard rather than the familiar 6809 chip. Consequently, Dragon's future may be intimately linked with the success or otherwise of MSX.

However, Dragon users can take some comfort from Eurohard's Justo Alvarez who has pledged that the UK will not be abandoned. Nevertheless, it would seem obvious that Eurohard's first priority must be to build up the Spanish and European markets. The UK, certainly as far as the 32 and 64 are concerned, offers fewer opportunities for immediate expansion.

The question which will concern existing Dragon users is whether or not any future Dragon MSX machines will be compatible with the original 32 and 64. This question is, as yet, unanswered.



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present . . . TWO NEW RELEASES
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SPRINT BASIC COMPILER
A rapid step forward in Home Programming.
The newly released 1.1 upgraded compiler written by Dr. David Gray for Dragon 32 and 64 owners. By converting your own BASIC programs into intermediate code. Sprint accelerates them by up to 5 or even 10 times their normal running speed. Supporting virtually all the integer BASIC and cassette and printer commands. Sprint programs are not only compiled from tape but also run independently of the compiler.
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"... I thought this was an excellent version of the game. Well worth buying." (Home Computer Weekly).
Change level of play at any point in the game.
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DRAGONCHESS
BACKGAMMON - DRAGON 32
REVERSI - DRAGON 32
INVADER CUBE - DRAGON 32
DOMINOES - DRAGON 32
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All five games for just £19.95
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REVERSI
At last! Reversi running on your Dragon 32 or 64. 2 levels of play, full instructions and computer demonstration for beginners.
INVADER CUBE
As well as being one of the best games of skill written for the Dragon 32 and 64 it also has some of the best pure machine code graphics we have ever seen.
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Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD.

Screen dumps wanted

YOUR correspondent, Graham Marshall (September *Dragon User*, letters) must surely be mistaken about his 100K joysticks not working. I have repaired various joysticks for the Dragon over the last two years and it works well with 100K potentiometers, or even 50K at a pinch.

The only possibility I can think of for his problem is that potentiometers come as linear resistors or as logarithmic resistors. If you have a log potentiometer instead of linear then you have trouble and possibly that is the problem.

On another matter, Dragon Data formerly offered, free-of-charge (*Dragon World* Number 2, page 11) information on screen dumps for the Epson and other printers. Could somebody possibly let me have this information. I have an Epson RX-80.

N Brierley
5/6 Waterfall Cotts
Marsden
Huddersfield

The height of fashion?

WHY IS IT, as your September editorial has it, that the Dragon 32 is "regarded as slightly old-fashioned now"? Let's examine it.

Is 32K RAM old-fashioned? It's good enough most of the time for home computer applications. 32 characters per screen line, and reverse video for lower case, may not be the latest thing, but they hardly matter except for word processing, and the better WP programs overcome the problem anyway.

I have been able to compare the Dragon 32 in some detail with a newer arrival, the Oric Atmos, which had some very good reviews, and is certainly a nice machine, with some "pluses" such as a larger keyboard, auto-run on demand, integer variables, and a REPEAT . . . UNTIL command. On the other hand, it lacks the Dragon's commands RENUM (essential in my view), INSTR, and STRING$; and the extremely useful Dragon feature of accepting MID$ on the LHS of an assignment statement.

The Dragon allows 255 characters per command line, giving one effectively the equivalent of a limited Pascal "block" facility after "THEN" or "ELSE", while the Oric only allows 80. The Oric's facility for storing data on tape is quite primitive.

From a brief look at the handbook of a still newer (and much acclaimed) arrival, the Amstrad, even this doesn't seem to have all the Dragon's plus points enumerated, though it does of course have some plus points of its own. We are told that in the 6809 the Dragon has the most modern processor, though how that helps, except for assembly language programming, is not clear. All in all, however, the Dragon 32 has some very solid virtues, which competitors in the same price bracket do not seem to have fully emulated even today.

Ruben Hadekel
London

Handicapped database

WE ARE in the process of establishing a database of software for the handicapped — Bardsoft. Briefly, each entry to the database will contain a description of the programs, the handicaps they are suitable for, the type of computer system required, name and address of supplier/developer and price, and so on. This information will be made available through printouts in answer to specific enquiries.

The aim of Bardsoft will be to facilitate the exchange of information on software relevant to any aspect of the lives of handicapped people. One major addition will be the concerted effort to promote the database, and therefore the software, abroad. This is what we have been doing successfully for non-software products in the field.

As we are currently collecting and processing information, we would be pleased to hear from any of your readers who may wish to contribute to Bardsoft. For further information please contact me at this address: Handicapped Persons Research Unit, Newcastle Polytechnic, No. 1 Coach Lane, Coach Lane Campus, Newcastle upon Tyne NE7 7TW.

Peter Curran
Handicapped Persons
Research Unit

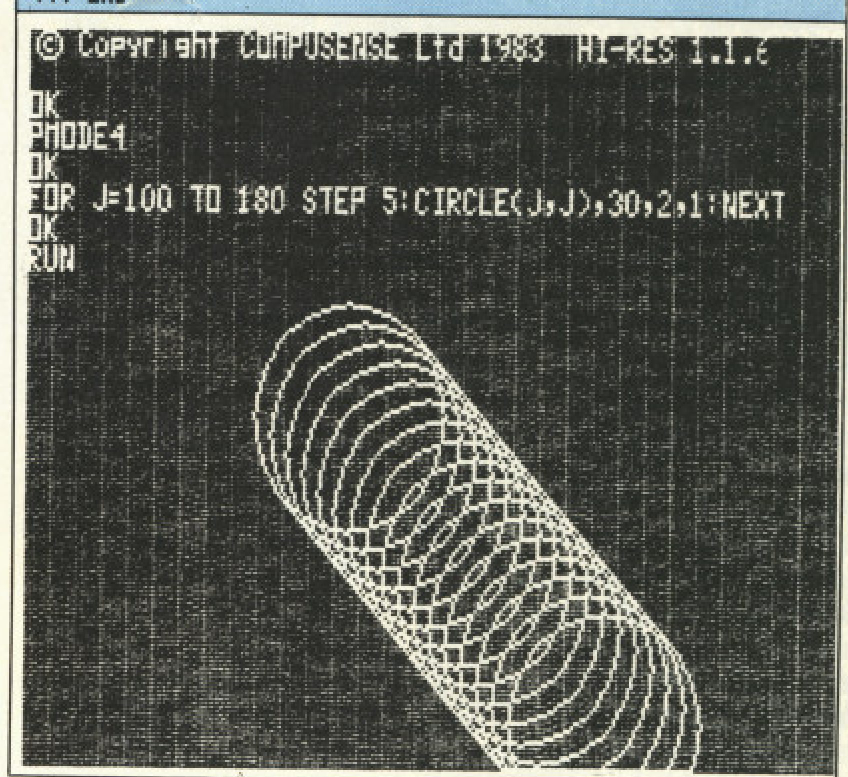
Screen dump provided

BELOW please find a listing and sample run of a Basic program for the Dragon 32 which dumps the contents of the high resolution screen to an Epson FX-80 printer.

I doubt whether a simpler graphics screen dump program can be written in Basic.

Stan Opyrchal
Compusense

```
1 REM DUMP HI-RES SCREEN TO EPSON FX-80 PRINTER
2 REM BY COMPUSENSE LIMITED
9 REM SET LINE SPACING TO 1/9TH INCH
10 PRINT£-2,CHR$(27);"A";CHR$(8)
100 FOR I=0 TO 31
130 PRINT£-2,CHR$(27);"K";CHR$(192);CHR$(0);
150 K=&H600+I+191*32
220 FORJ=0 TO 191:PRINT£-2,CHR$(PEEK(K));:K=K-32:NEXTJ
240 PRINT£-2:NEXTI
299 REM RESET 1/6 INCH LNE SPACING
300 PRINT£-2,CHR$(27);"A";CHR$(12)
999 END
```



Software Top 10

1	(8)	**Up Periscope**	Beyond
2	(9)	**Ring of Darkness**	Wintersoft
3	(–)	**Chuckie Egg**	A&F
4	(1)	**Pedro**	Beau Jolly
5	(2)	**Hunchback**	Ocean
6	(3)	**Hungry Horace**	Melbourne House
7	(–)	**Chocolate Factory**	Minits
8	(–)	**Dragonfly 2**	Hewson
9	(–)	**Space Shuttle Simulator**	Microdeal
10	(–)	**Cave Fighter**	CAB

Chart compiled by Websters Software

Tape to disk

I AM interested in corresponding with someone on the subject of reformatting programs written for tape data storage and retrieval for the Dragon 32 to disk storage/retrieval under Dragon DOS.

If anyone is interested please write to me at Hamaagal 32 Rimon, Kiriat-Ono 55702, Israel.

Harry Taylor
Israel

RETURN OF THE RING

THE RING OF DARKNESS PART II

At last the saga continues . . .

The Guardian of Shedir is defeated, the Hell spawned hordes of the Evil Sage lie at bay. Now Ringbearer, wielder of the Four Bright Rings, must face the greatest challenge: to return the Ring Of Darkness to its creators on the hidden planet Ringworld . . . And somewhere at the ends of time the forces of evil are preparing their revenge.

After one year of development, Wintersoft are proud to present the most sophisticated game ever created for the Dragon 32. Written 100% in machine code, RETURN OF THE RING is an astounding multi program blend of superb high resolution colour graphics and advanced routines that allow you to communicate with your computer in complete sentences. You will face challenge and excitement as you and your Ringworld companions travel a mysterious planet and brave the dangers of an amazing three-dimensional forest moon. An epic adventure unrivalled for its wealth of detail and diversity.

May luck travel your path.

Please note: RETURN OF THE RING is a complete adventure. You need not buy THE RING OF DARKNESS to play it.

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6809 show

OVER seventy-five per cent of the available stand space at the 6809 Colour Show for Dragon and Tandy users on November 17 and 18 had been filled at the time of going to press.

Richard Bergin, project manager of Computer Marketplace, organisers of the event, was confident that the show would be a success judging by the response both from companies that will be showing their products and from the public at large. "We have had an average of £70 per day of ticket sales for the show," said Richard, "which is just less at the same time as we had for the Acorn User show that we organised earlier in the year."

The show, the first ever for the Dragon and Tandy computers, will be a major opportunity to gauge the amount of commitment left for the Dragon. Most major Dragon software houses have booked stand space and it is believed that Eurohard SA, the Spanish manufacturers of the Dragon, may be there.

Justo Alvarez, Eurohard's industrial engineer (see profile, page 10 this issue) has shown an interest in the event and, according to Richard Bergin, it it hoped that he may do a radio interview on the Young London spot.

Mike Quelch, a former Dragon Data director, has been in touch with Eurohard about the possibility of someone from the company appearing on London Broadcasting Corporation's Young London spot at 3 to 3.15 pm on Sunday, 11 November, a week before the show starts.

Mike's interest in the show is purely personal, having worked so hard to bring about the success of the Dragon Professional and OS-9.

Neither GEC nor Touchmaster will be attending.

Microdeal will be selling its products at a special offer, with at least £1 off everything according to managing director John Symes. Some items will have up to 75 per cent off, and Microdeal will also be introducing its new range of low cost games for the Dragon.

There will also be a free stand for the User group or any group of people who come up with the best application for Dragon software, modems or other forms of communications.

Richard Bergin has written to several User groups giving them the chance to come up with an idea, and any group of persons interested in having a stand at the fair and who come up with the best idea for an application for the Dragon are asked to contact Richard at Computer Marketplace, 20 Orange Street, London WC2H 7ED, telephone 01-930 1612.

Computer Marketplace is also offering readers of *Dragon User* a 50p discount to enter the show.

Simply cut out the coupon on this page and take it along with you when you go to the show. The coupon is valid for one day only and only one coupon per ticket is allowed.



S.O.S.

A DRAGON owner has contacted Computer Marketplace with a problem. He is confined to a wheel-chair but has received two free tickets to the 6809 show for himself and his helper. Although he works, he has no form of transport and is keen to attend his first ever show. Anyone in the Leeds area who might be able to give Don Buckley and his helper a lift to and from the show is asked to contact them at 30 Airlie Avenue, Harehills, Leeds LS8 4JL, telephone 0532-629934.

Unpaid debts

GAMES and Computers founder John Richardson is facing legal proceedings to recover outstanding debts.

Several companies are believed to be seeking court permission for public examination of his accounts. Microperipherals has entered judgement against him for £5,500 as proprietor of Games and Computers, according to company secretary Richard Geele. A charging order has also been made against his property, although the serving agents have been unable to locate him. Permission is now being sort to serve a writ by post.

Readers who have sent money to the club are unlikely to see either their money or any orders that they may have placed. It is thought that John Richardson has debts totalling £20,000.

Computerhouse UK Limited are not involved in any of the legal action. As of the 30 August John was effectively dismissed from the company.

Alan Monaghan of Computerhouse UK Limited said that John had been operating as a sole trader under the name of Computerhouse UK since January 1984. He approached Alan and other directors of what is now Computerhouse UK Limited (see *Dragon User*, September page 8) who initially tried to help people to secure their orders. John was appointed to the board of directors as a prelude to Computerhouse UK Limited taking over the activities of Computerhouse. However, when Alan realised the extent of John's troubles it was decided not to take over the activities of the club. This leaves John Richardson as a sole trader liable for all outstanding debts. "It never was our problem," said Alan Monaghan, "John got himself into a terrible twist and we tried to sort out his problems".

Cotswold Computers who are interested in taking over the running of the club are likewise not involved in any of the legal action. David Tomlinson of Cotswold Computers has taken the list of club members, thought to number about 2,000 and is in discussion with several interested parties about the editing of a magazine.

GEC price deal soon

CUT PRICE Dragons and peripherals could be on offer soon throughout the major retail stores in Britain.

GEC is negotiating with Boots, Dixons, Comet and other high street stores the price of ex-Dragon Data stock according to a spokeswoman at the company.

The company also has an agreement with Eurohard to sell future Eurohard products it was confirmed.

Ron Bosanko, former chairman of GEC Radio and Television, who played a major role in GEC's affairs with the Dragon (see *Dragon User*, May 1984) is, however, no longer involved with proceedings. He has left GEC to join an electrical equipment manufacturer and has been replaced by Dr Ian Johnston, who has come from GEC McMichael. This



means the GEC has now lost its two top men (Brian Moore and Ron Bosanko, *pictured*) involved in the Dragon take-over.

Complete system

COMPUSENSE is offering Dragon 32 owners £40 credit in part exchange for any of its new deals. Managing director Ted Opyrchal said that the company is making available several packages to provide users with a complete system.

A Dragon 64, single disk drive, Flex operating system, Editor/Assembler and disk Basic will retail for £399.99. Other packages incorporating twin disk drives and OS-9 are also being offered.

Any used Dragon 32's that the company gets hold of will be donated to Local Education Authorities. However, Ted cautions that only a few 32's will be available for donation.

The reduced prices have come about due to GEC making available its stocks that it obtained from Dragon Data.

For full details of the available packages and prices contact Compusense at 286D Green Lanes, Palmers Green, London, N13.



THE WS2000 modem manufactured by Miracle Technology is a BABT (British Approvals Board for Telecommunications) multi-speed modem which can be used with telecommunications systems run by British Telecom. The modem, which is compatible with a number of computers including the Dragon 64, has baud rates of 75, 300, 600 and 1200. Unfortunately the company has no plans to write any software for the Dragon so Dragon owners would have to write their own. Further details about the modem (price approx £150) are available from Miracle Technology, 10-12 St Peters Street, Ipswich IP1 1BX, telephone 0473-50304/5.

New titles on the way

TACKLING Weetabix munchers, gold bar pickers and moonbase passengers are some of the delights awaiting users of the latest batch of software for the Dragon.

From Romik Software comes Weetabix versus the Titchies, a machine code arcade game featuring the characters from the Weetabix television advertisement.

The game is available from Weetabix at £3.75 including post and package and VAT. (Weetabix club members can receive a copy for £2.75.)

Weetabix are also holding a national competition offering 100 Dragon 64's, together with disk drives, colour portable televisions, six games including Weetabix v the Titchies and a glow in the dark poster as prizes. Details of the competition can be found on any Weetabix cereal packet.

Blaby Computer games has four new Dragon titles. The Bells is a Hunchback type game with 14 screens of danger for you to challenge. Perilous Pit puts you deep in the crystal mines against the dreaded Orbis and Boris the Bold has the same theme.

Morbid Mansion is an arcade type adventure which has you in search of gold bars.

Blaby's games now retail for £1.99 (down from £5.50) except for Morbid Mansion which retails at £3.99. Further details from the company at Crossways House, Lutterworth Road, Leicester. All of the games will be on display at the 6809 show.

Microdeal has two new releases for November, Caverns of Doom a machine code text adventure and Starspores an arcade style game. The company has also released three new games recently. Crystal Castle is an arcade game, Syzygy a graphic adventure, and Escape from Moonbase. All games retail for £8, though Microdeal is working on a new range of low cost games which it hopes to retail for about £2.

Both Microdeal and Blaby are negotiating with Eurohard in the hope of getting their software included in Eurohard's packaging for Dragon.

Design-design, formerly Crystal Computing is putting out Rommel's Revenge for the Dragon. In very fast machine code, there is a full feature battle with missiles, tanks and so on. The expected retail price is £6.50.

Software cuts

TOUCHMASTER has dropped the price of its software for the Dragon. Most games now retail for £3.95 (excluding p&p) with educational cassettes costing £5.49.

A complete list of the latest Dragon software prices and a mail order form can be obtained from Touchmaster at PO Box 47, Port Talbot SA13 1ZQ.



"Young Nick is the only one who can use our Home Micro, so Bernard has to depend on him for our investment programme!"

The Spanish connection



A THIRD LEASE of life is being given to the Dragon, courtesy of Eurohard SA — the Spanish-based microcomputer manufacturer. Backed by a combination of public and private funds, Eurohard is in business to "give continuity to the Dragon's life and improve its overall standing", according to Senor Justo Alvarez, Eurohard's top man in the UK.

Senor Alvarez is Eurohard's director for Industrial Engineering. He has been in Britain for over a month-and-a-half organising and overseeing the transfer of machinery and products from Dragon Data's plant in Port Talbot to Eurohard's factory in Caceres, Spain. His aim is to begin immediate manufacture of the Dragon 32 and 64 in Spain for world-wide distribution. In the short term, Eurohard will produce the Dragon to the exact same specifications as Dragon Data's 32 and 64. However, within six months, there could be some interesting developments.

Justo, who spent 10 years working for the national Spanish railway company prior to joining Eurohard, is hoping to specialise in the development of new products once he has managed to get the manufacture of the 32 and 64 on the way and has overcome any initial teething problems. With Spanish railways, he was responsible for development planning and was especially concerned with data processing. The Spanish railway company, he said, was the first in Europe to have electronic ticket sales, developed in conjunction with the giant German electronics company Siemens.

MSX — top of list

The project that comes top of his list in Eurohard's development plans is the manufacture of a Dragon MSX machine. Eurohard has obtained an MSX licence from Microsoft for an undisclosed sum and plans to begin production of the machine at the beginning of next year. The company is also studying the feasibility of adding a second chip to make the machine compatible with Dragon software. Justo confirmed that it was Eurohard and not GEC that has obtained the licence to manufacture the Dragon MSX machine.

So important a priority is MSX, that Eurohard is shelving, for the time being, plans to manufacture the Dragon Professional, or project Alpha, as Justo referred to it. "Alpha is not so important, we are more concerned with MSX and peripherals."

Eurohard has huge financial backing. Public sector finance comes from two Spanish development agencies — Soviex and Ini. Soviex is a local development agency with just under a 40 per cent stake in Eurohard. Ini, the national development agency, has a less than 10 per cent stake, but owns half of Soviex and is reputedly the largest business consortium in Spain. It has diverse fields of interest and is especially concerned with new technology, hence the stake in Eurohard.

Together, the two development agencies own just under half of Eurohard. The major backer of the company is a large financial group headed by Spanish Visa card chairman, Eduardo Merigo, though Visa card itself has no connection with Eurohard.

Formed earlier this year, Eurohard's headquarters is based in Madrid, the communications capital of Spain. Eurohard's Madrid offices will be responsible for public relations and marketing, while the manufacture of the computers will take place in the Spanish regional development area, Caceres, near Portugal.

Justo claims that the Dragon is the third biggest-selling micro in Europe, coming behind the Spectrum and Commodore machines and, in Spain leastways, ahead of the Atari and Oric. He intends to maintain and hopefully improve on this position, particularly in countries where there are no entrenched computer firms.

Justo Alvarez of Eurohard

Obvious advantages

There are obvious advantages in Eurohard's attack on the Spanish market and it is evident that the company expects to capture the lead from Sinclair. To back this up, a Spanish television programme is planned, with Eurohard taking a similar role to that undertaken by Acorn for the BBC computer tv show in Britain.

Justo stresses, however, that Eurohard is not solely concerned with the Spanish market. The company is concentrating on a world-wide user base, including Britain. In the UK, distribution will be by GEC with technical support by Touchmaster.

When asked if he thought that many more Dragons would be sold in Britain he replied that GEC is a large company "and large companies are not used to thinking in the short term — take this as a sign that the Dragon will improve its position in the UK". Justo went on to say that Eurohard is getting in touch with software companies in Britain, and indeed "with all the people we know who have connections with the Dragon".

"We are open to help and suggestions that could be beneficial for the Dragon, especially concerning software and peripherals — we can't distribute and sell them by ourselves. I hope this is the beginning of a new Dragon era", said Justo, "we don't want Dragon owners to feel abandoned — they are *not* abandoned."■

— Gordon Ross

Dragonsoft

New software for review should be sent to *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD.

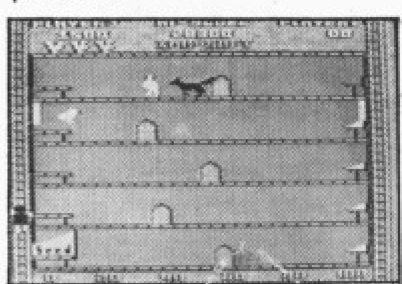
Hatch

Program: Chicken Run, Impsoft, 149 Balham Hill, London SW12 8DJ. **Price:** £7.95

FARMER Folly runs a chicken farm — rather a small chicken farm, as there is only one chicken in it. You have to guide the chicken to the nest-boxes, where she will auto-brood and lay an egg, and to the feed trays to replenish her energy with corn. You also have to guide Farmer Folly to collect the eggs before they hatch into hungry chicks, and to fill the feed trays.

There is a baddy as well, of course — a fox appears at intervals through holes in the wire, intent on eating the chicken, or one of the newly-hatched chicks. Having a chick eaten is quite a good thing, as this prevents it from depleting the corn supply. If the fox eats your chicken, however, one of your three lives is lost.

The game is controlled by joystick only. The joystick lever controls the direction in which the chicken moves, and the fire button controls the farmer. This technique of controlling two moving objects with the same joystick doesn't seem to be terribly effective; I found it impossible to persuade the farmer to do anything except run aimlessly up and down a ladder unless the fire button was held down continuously, when the farmer's movements were no less random but more purposeful.



The graphics are good, though I would have liked to have more than one screen. The sound effects are initially impressive, but soon become irritatingly repetitive.

On the whole this is an interesting game, but not, I think, one with lasting appeal.

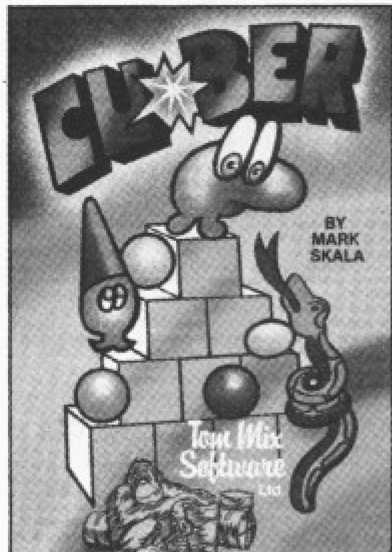
Margaret Norman



Burble

Program: Cu*ber, Microdeal, 41 Truro Road, St Austell, Cornwall. **Price:** £8.00

C*UBER from Microdeal involves directing a cuddly looking orange creature of the same name around a pyramid of cubes. The object is to change the colour of each of the cubes to the "target" colour, displayed at the top of the screen, by hopping on them.



On the lower screens only one or two hops are required to change a cube to the correct colour. However, as the game progresses, the cubes change colour every time you hop on them, even if they were the correct colour to start with.

Various nasties exist to try and stop you. These include balls of assorted colours, Vipers, Dorks (!), and Nurds (!!), some of which are fatal to touch, others do things like changing the colour of the cubes they jump on, just to make things worse. Jumping on a green ball causes all of the nasties to freeze, allowing Cu*ber a few seconds respite.

The player has three lives, and when one is lost by touching something that shouldn't be touched Cu*ber emits a burbling noise and mutters "!#?*" (in a speech bubble) under his breath. I suppose it's nice to find an alien that's human for a change (?).

The graphics are as good as PMODE 3 allows, although the movement is rather jerky, and not up to the author, Tom Mix' usual standards. The sound effects too are a bit limited, consisting mainly of "boing" and "squelch" noises. The overall effect however is good, and compared to some of the games currently on the market, Cu*ber scores well.

David Rowntree

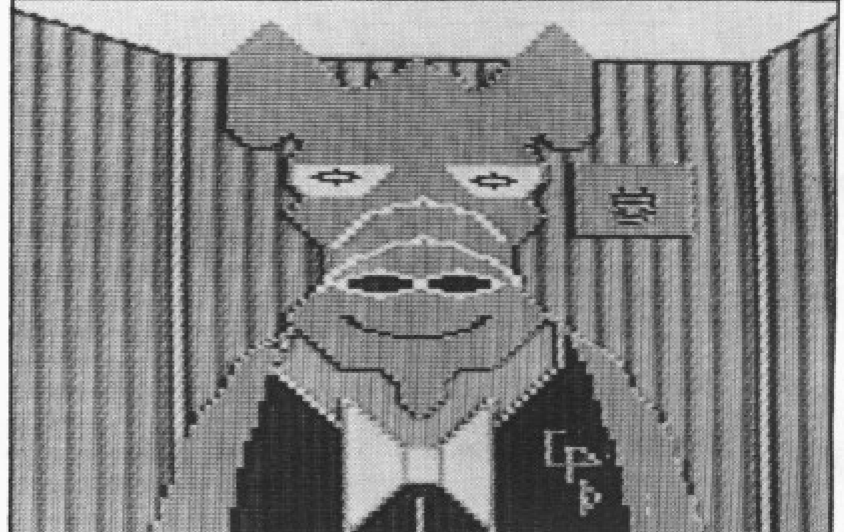


Stakes

Program: Cecil Plays 21, Snip Software, PO Box 20, Woking, Surrey GU21 3QN. **Price:** £4.95

SNIP Software is a new name to Dragon Owners, its first releases are both card games, namely Craps and Pontoon — the latter is reviewed here.

Cecil Plays 21 is a faithful reproduction of the game of Pontoon with a few extras added. The program, which is written in Basic, autoruns on loading and after several title screens, some in high resolution graphics, gives brief instructions on how to play.



The graphics involved in the game range from good to disappointing — all the cards are displayed using low resolution chunky graphics and text, however there is a nice picture of Cecil P Dragon — your opponent in the card game. Cecil appears after each game either grinning or frowning depending on whether he has won or lost.

Achieving the magic 21 causes a different hi-res display to be shown. The game is very simple to operate, you simply enter your stake and press "T" to twist or "S" to stick.

Unfortunately, there seems to be a few bugs in the program. An ace can count as one or eleven in pontoon, but Cecil always uses it as eleven which means he sometimes "busts" below 21.

Another, more serious, oversight is that the cards always appear in exactly the same order after loading the game. This is because the autorun routine used resets the random number seeds that the program uses, and the program doesn't bother to randomize these at the start of each game. Obviously, after a while you get to know the pattern of cards which defeats the object of the game.

At £4.95 this piece of software is one of the cheapest around, but don't expect to get anything stunning for that price.

Brian Cadge



Attack

Program: Android Invaders, Lyversoft, 66 Lime Street, Liverpool L1 1JN. **Price:** £5.95.

WHEN I saw the word "Invaders" in the title of this cassette, I must confess my heart sank a little. What games-players (and reviewers) look for is something new, exciting, different . . . not just another version of a tired old game. Then I thought, no, there are so many invaders games on the market already that this surely can't be the same again — it must surely have some new twist to it — so I loaded it with high hopes. I'm sorry to say,

though, that these proved unfounded.



Not only is this a conspicuously unoriginal game, it isn't even a good one. There are some major bugs in it which cause you to die helplessly with great speed. I tried playing it with both keyboard and a joystick, at several different levels of difficulty, with the same result every time — I shot one or two little androids, then I apparently got hit by a succession of invisible bombs and the game ended.

What I saw of the game before disappearing in a puff of smoke made it depressingly clear that, even without the bugs, this tape would really not be a useful addition to anyone's collection. The graphics are uninspired, the sound effects dull, and the action slow. The attractions promised by the instructions in later phases of the game didn't sound all that enthralling, either.

Sorry, Lyversoft, but this really isn't up to the standards of commercial software nowadays. Back to the drawing-board with this one!

Margaret Norman

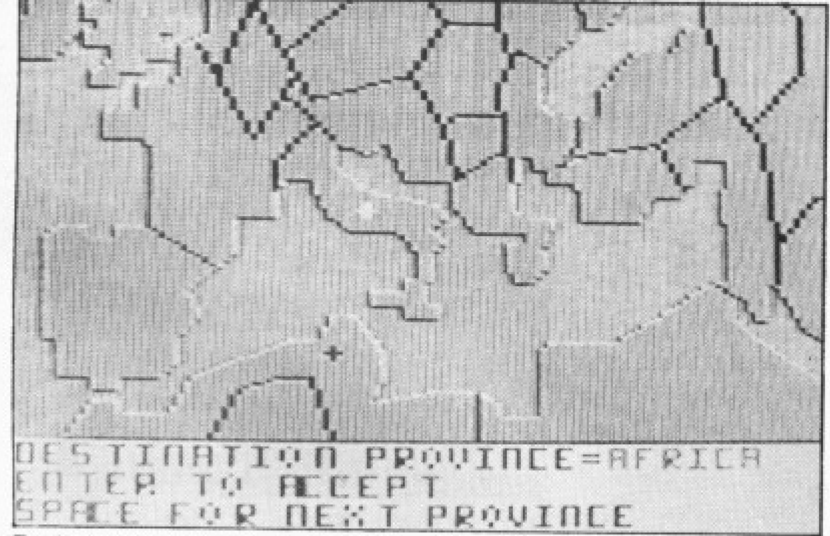


Legions

Program: The Fall of Rome, Argus Press Software, 1 Golden Lion Square, London W1R 3AB. **Price:** £6.99

THIS IS an adventure-type game written in Basic, and also available for a number of other machines. The general idea is that you are in charge of the Roman Empire, with control over forces, income, expenditure and so on in all parts of your Empire. On the screen you have a coloured map of Europe (as we call it today) with the countries (as they were then) marked on it. Eleven tribal groups from the north cause a lot of bother and as if this was not enough you also have to find time and resources to do battle with armies from the two Empires of the East.

The game progresses through three phases: The Income and Expenditure phase, the Movement phase and the Combat phase. I found that it took a great deal of practice to be able to understand and play this game properly and even stand a chance of securing a victory. Playing a game does take up a lot of time, but if you are *"into"* this type of game then it is quite good and takes a lot of concentration.



During each stage a marker indicates which country you are dealing with at any one time, raising armies, converting static legions to mobile legions and so on.

While you are busily trying to put your Empire in order, others are trying to destroy it.

The display is also quite good, though I feel the game is not for the younger members of a family.

Iolo ap Gwynn



STAR GAME

Quest

The Guardian of Shedir is defeated. The hordes of the Evil Sage lie at bay.
Now Ringbearer, wielder of the Four Bright Rings, must face the greatest challenge, to return the Ring Of Darkness to its creators on the hidden planet Ringworld.

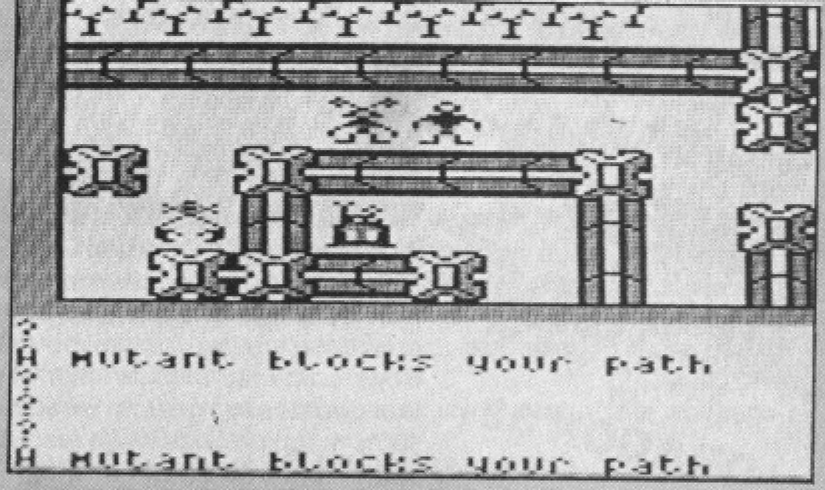
Program: Ring of Darkness, Wintersoft, 30 Uplands Park Road, Enfield, Middlesex EN2 7PT. **Price:** £9.95

WHEN Wintersoft originally released *The Ring of Darkness* it was surely one of the best adventure games available for the Dragon. The game enjoyed such success that it was inevitable that a sequel would follow.

Return of the Ring is subtitled "The Ring of Darkness Part 2", but as a piece of software it is far superior to its predecessor. The program is written in 100% machine code with full colour high resolution graphics (PMODE 3) mixed with text which includes lower case.

A hi-res picture showing your location is constantly displayed, below this is a text window where command lines are entered. One of the best features of this game is its ability to handle whole sentences, such as "Give the dagger to Merek the Elf" and so on.

The quest begins in a maze which is displayed from above, figure movement is achieved via the arrow keys. In this part of the adventure you can fight and transact with mutants and enter villages to buy and sell useful items. These villages are also displayed and entering a shop causes a 3D picture of the inside of the room to be displayed.



As with the Ring of Darkness, side A of the tape enables you to set up your role play character — you are given points to divide up amongst number of lives and various characteristic attributes, and you must also decide what form your character will take, for example "Human Warrior" or "Elf Technician". This procedure need only be done once as you can save the game and your character on tape at any point.

The game itself is on side two of the tape. Clear instructions are given as to when to start the cassette — the game is too large for 32k so parts are loaded in and out as required.

Other locations, such as the forest planet, are loaded in from tape and are shown in excellent 3D graphics. A few characters that you meet are controlled by a program called Actel, and are capable of doing most things you can do of their own free will and may join you to help in your quest.

There is simply not room to describe all of this games' features — the program took over a year to create. It is certainly the best adventure/role play game that I have seen for the Dragon so far and is excellent value at £9.95.

Brian Cadge

MICROMAIL

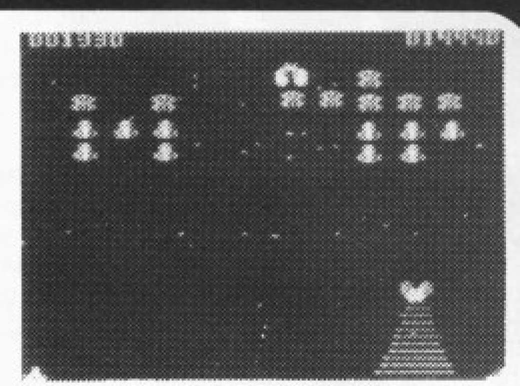
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NEW FROM MICRODEAL

Galagon

DRAGON 32

Wave after wave of spiralling attackers trying to capture your fighters Score big time points during the challenge round. One Joystick required.



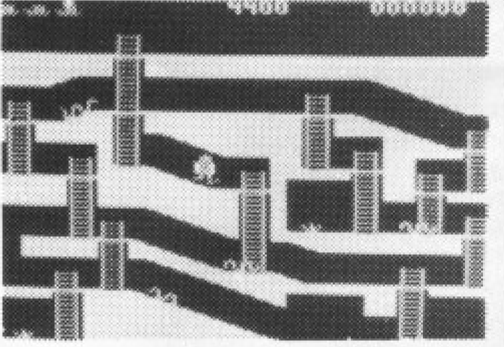
Tape £8 incl. P & P

NEW FROM MICRODEAL

King Tut

DRAGON 32 & TANDY COLOUR 16K

Journey through the caverns of King Tut's tomb. You are on a quest to find treasures hidden in the caverns below. You light your way with only a small candle that grows dimmer as time passes. Watch out for the snakes and the ghost of King Tut himself. 5 screens challenge your ability every step of the way in this 100% machine code, high resolution graphic quest. For 1 player. Joystick required.



Tandy Colour versions only available at Tandy Shops

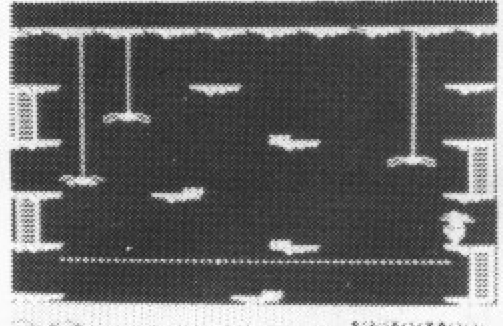
Tape £8 incl. P & P

NEW FROM MICRODEAL

CRASH

DRAGON 32

Mario, our hero from THE KING is back. This time we find him lost in the tropical wastes of the Amazon, frantically trying to get back to his plane. He must outwit the elusive spiders, bouncing snails, jumping frogs, some rather smart monkeys and finally hope that bird doesn't get him when his parachute opens. 100% machine code, high resolution graphics, super sound and 4 screens. For 1 or 2 players . Joystick required.



Tape £8 incl. P & P

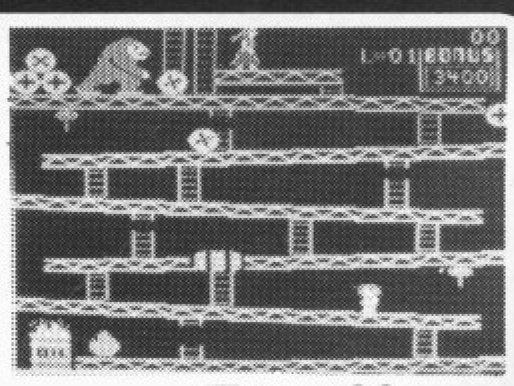


THE KING

DRAGON 32 & TANDY COLOUR 32K

A legend in its own time, simply the best software to have been written for the Dragon and Tandy color computers. With its full colour, high resolution graphics, sound and 100% machine code, surely no collection can be complete without it. Joysticks required. For 1 or 2 players.

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Playing with sprites a la mode

***Brian Cadge** reviews Premier's sprite graphics board*

FOR THOSE Dragon owners who turn green when they see graphics produced by Atari and CBM 64 machines, help is close at hand. Premier Microsystems has just released a sprite graphics board for the Dragon 32.

The board itself is connected via a ribbon cable to the Dragon's cartridge port and takes all its power from the host computer. After initial power up, the user simply types EXEC &HE002 and takes the tv lead from the Dragon's socket and puts it in the one provided on the graphics board.

All the electronics are housed in a two-tone plastic case measuring about 4 × 6 inches, and it can be purchased either ready-assembled or as a kit. The circuitry is quite complex and very tightly packed so you need a fair amount of experience before attempting any self-assembly. Instructions and a wiring diagram are given in the manual, but these could hardly be described as being written for the beginner, and there are no hints on fault finding.

Four modes of operation

The new display is produced by a Texas Instruments TMS 9929A VDG chip. This offers four modes of operation with 32 sprite levels and 16 colours.

Sprites are simply moveable graphics objects which have their own priority level — that is, the sprites with a lower priority will pass "behind" those with a higher priority. Sprites are totally non-destructive and don't need to be "rubbed out" when they are moved. As each plane can contain only one sprite this means 32 individual sprites can be displayed at any time, although the lowest priority is the same as the background colour and will not often be used.

The four separate display modes offer the following:

Mode	*Resolution*		*Colours*
1 text	40 × 24	text only	2 of 16
2 text	32 × 24	sprites	16
& graphic	64 × 48		16
3 Hi-Res	256 × 192	sprites	16 (2 in a group of 8 pixels horizontal)
4 Graphics	64 × 48	sprites	16

On power up, mode 1 is automatically selected with white text on a dark blue background. The display quality is very high — much improved on the Dragon's own tv display. Mode 1 is usually used for programming as this can display the most characters at once, but cannot have sprites. The display is noticeably slower than the Dragon's own, especially when scrolling.

Probably the most useful mode for games is Mode 2. Although the resolution is a chunky 64 × 48, you do get the advantage of mixing text with graphics. In addition, all game characters are likely to be sprites which have the same resolution in any mode. Two sets of sprite shapes are available and all of these are redefinable. The first set is the entire character set, and can be used only in mode 2. The other set contains 32 shapes and can be used in any sprite mode.

Sprites can be displayed as either normal or double size in all modes. However, all sprites have to be the same size.

The graphics board also contains an eprom to interface the new commands available with Microsoft. The technique used is to interrupt the command handler of the Dragon and check for certain commands such as Pset and CLS. The computer is then redirected to give these new meanings. I prefer the method of adding commands, as this prevents the programmer from having to use rather meaningless commands like RESET to define a sprites shape. Most of the new meanings are more obvious; PMODE is used to select the mode, although the graphics page number is no longer required as the board has its own 16k of video memory.

This extra memory also has the advantage of freeing most of the Dragon's memory that is usually reserved for its own display — over 5k is returned to the user. It is not possible to switch between the Dragon's display and the boards display, without switching off first. Also the Dragon's sound is *not* produced through the TV speaker when using the sprite board.

Commands to plot points, draw lines and circles are included, but by far the most powerful command, Draw, has not been implemented; neither has the Paint command. Print@ can be used as normal on the now expanded screen. Put and Get are not included as these are obviously not needed with the introduction of sprites. PUT@ is used to position a sprite on the screen — the x and y coordinates are given, together with the colour, shape size and level of priority.


Peter Rihan of Premier

In addition to the sprites, all the characters are redefinable using the "PRINT!" command, so it is possible to get pseudo hi-res graphics even in the text modes.

Although the display potential of the board is greater than anything a Dragon could normally produce, the implementation of the Basic leaves something to be desired. As already mentioned, the "new" commands are rather limited compared to the Dragon's own. In addition, one of the most important parts of sprite graphics is missing completely — that is collision detection.

The games' programmer will have to muck around with comparing coordinates, with all the problems that entails. There is also no facility for setting sprites moving on their own in a given direction, each one has to be individually moved. With 30 odd on the screen this can seriously affect the speed of a Basic game.

The manual which Premier supplies with the board also contains details of machine code entry points to their ROM for anyone wanting to write arcade speed games using the board. The manual describes each command in detail, but there is only one example program given at the end and this doesn't even use sprites! Although the general documentation is good, it is not up to Premier's usual high standard. Many more example programs are needed.

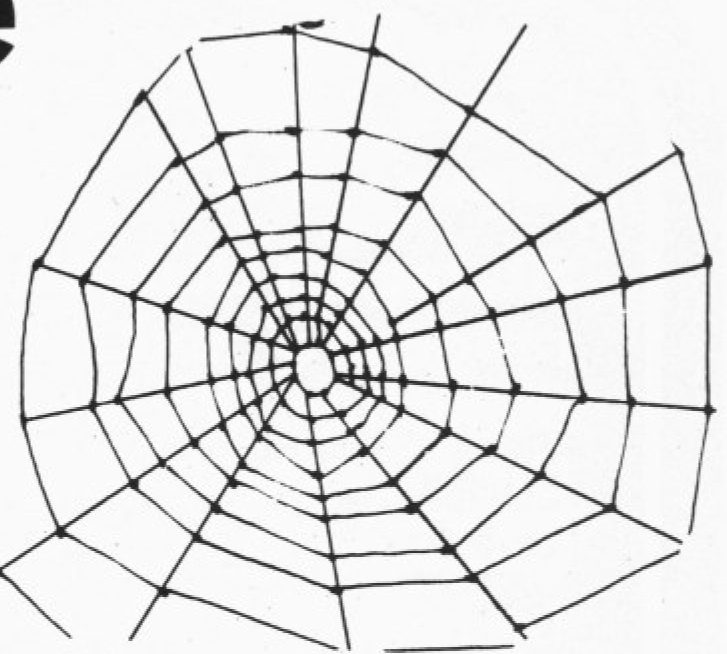
Comes the crunch

The crunch comes when you see the prices — £99:95 as a kit or about £127 ready-made. This may seem a lot, but is not unreasonable considering the components involved. Unfortunately for Premier, I think many users will plump for cheaper software alternatives like "Sprite Magic" from Knight Software at £17. Although you don't get the advantages of 16 colours, an improved display and hardware sprites, you do get the same upper/lower case, software sprites and a much more thorough extension to Basic.

The final decision as to whether you really need this board is yours of course, but be warned, the board will only operate with 32k machines. Due to a short-cut taken by Premier in its design, the board will not work with upgraded Dragon's or Dragon 64's. However, Premier say they can alter boards for 64k machines if required.■

Spiderbyte

***D J Orrell** spins a web to catch a fly*



HARRY'S WEBB is a game for one player requiring quick reactions and concentration at all times. Using the keyboard you must direct Harry around the screen in pursuit of flies. Each time you catch and kill one, another appears at a different location.

The flies, however, will not sit and wait for ever — they will flit about aimlessly. The game itself has five levels with 10 flies to kill in each level. You will automatically progress to the next level when you have killed all 10.

To add a little more tension to the game a frog is working his way down the right hand side of the screen and should he reach the bottom before you have caught 10 then he will leap out and gobble you up.

Program Notes

20–40 Sets up music strings
60–210 Prints instructions
320–440 Main loop
450–490 Moves spider up
510–540 Moves spider down
560–590 Moves spider left
610–640 Moves spider right
660–840 End routine
860–940 Checks score
950–1030 Pokes data to graphics screen
1130–1290 Draws main screen
1300–1500 Draws title screen

```
1 REM****************************
2 REM*****HARRY'S WEBB**********
3 REM*******(C) 1984************
4 REM******D.J.ORRELL***********
5 REM****************************
10 DIMSU(1),SD(1),SR(1),SL(1),F(1),B(1),B1(1),FD(1),FL(1),FU(1),BL(1),FB(1)
20 W$="T1203V31L4D#FGL8B-P2L4GL1B-"
30 S$="01V31L4CFFAFFCL5FP4AL2FP2L46GGL2GL4FECCL2CP2L4CL2DL4EL1F"
40 E$="T803L4GFL2EL4EEDEL2.FL2EL4EL2DL4DDCDL2.EL2CL4DL2EL4EEDEL2FL4GL2AL4AL2GL4FL2EL4DL2.C"
50 CLS:GOSUB 1300
60 PRINT"HARRY IS A SPIDER WHO LIVES IN"
70 PRINT:PRINT"A GIANT WEBB,"
80 PRINT:PRINT"HARRY IS CONSTANTLY BEING"
90 PRINT:PRINT"BOTHERED BY PESKEY FLIES,"
100 PRINT:PRINT"HOWEVER, HE IS AT YOUR COMMAND."
110 PRINT:PRINT"USING THE ARROW KEYS YOU MUST"
120 PRINT:PRINT"CATCH AS MANY FLIES AS YOU CAN"
130 PRINT:PRINT"*********PRESS ANY KEY**********";
140 Q$=INKEY$:IF Q$="" THEN 140
150 CLS:PRINT:PRINT"THERE ARE TEN FLIES TO CATCH"
160 PRINT:PRINT"IN EACH OF THE FIVE LEVELS."
170 PRINT:PRINT"but beware A FROG HAS GOT HIS"
180 PRINT:PRINT"EYES ON YOU AND IF HE REACHES"
190 PRINT:PRINT"THE OPENING IN THE WALL IT'S"
200 PRINT:PRINT"                BYE BYE TO HARRY!!"
210 PRINT:PRINT"*********PRESS ANY KEY**********";
220 I$=INKEY$:IF I$="" THEN 220
230 CLS:R=30:L=1:SC=0:S=0
240 PRINT@263,"one"CHR$(128)"moment"CHR$(128)"please";:PRINT@327,"LEVEL";L;"SCORE";S
250 GOSUB 950
260 GOSUB 1130
270 X=8:Y=8:TX=242:TY=8
280 X1=X+7:Y1=Y+7:TI=0
290 GET(X,Y)-(X1,Y1),B,G:PUT(X,Y)-(X1,Y1),SD,PSET
300 SCREEN1,1
310 XA=RND(219):YA=RND(164):X2=XA+7:Y2=YA+7:GET(X2,Y2)-(X2+7,Y2+7),B1,G:PUT(X2,Y2)-(X2+7,Y2+7),F,PSET
320 '*****main loop*********
330 M=RND(R):IF M=5 THEN GOTO 860

340 TI=TI+.5:TA=INT(TI):PUT(TX,TY+TA)-(TX+7,TY+7+TA),FD,PSET:PUT(TX,TY+TA-5)-(TX+7,(TY+7+TA)-5),BL,PSET:IF TY+TA=>184 THEN PUT(242,184)-(249,191),BL,PSET:GOTO 650
350 IF TA=160 THEN SOUND1,1
360 IF PPOINT(X2+3,Y2+3)<>5 OR PPOINT(X2+3,Y2+4)<>5 OR PPOINT(X2+3,Y2+5)<>5 OR PPOINT(X2+3,Y2+2)<>5 THEN 870
370 IF PEEK(341)=223 THEN GOTO 450
380 IF PEEK(342)=223 THEN GOTO 500
390 IF PEEK(343)=223 THEN GOTO 550
400 IF PEEK(344)=223 THEN GOTO 600
410 IF TY+TA=>184 THEN PUT(242,184)-(249,191),BL,PSET:GOTO 650
420 GOTO 320
430 END
440 '***end of main loop******
450 '****move up***************
460 IF Y<=8 THEN Y=8:GOTO 320
470 PUT(X,Y)-(X1,Y1),B,PSET:Y=Y-7:Y1=Y1-7
480 GET(X,Y)-(X1,Y1),B,G:PUT(X,Y)-(X1,Y1),SU,PSET
490 GOTO 320
500 '******move down**********
510 IF Y=>169 THEN Y=169:GOTO 320
```

Continued on page 19

```
520 PUT(X,Y) (X1,Y1),B,PSET:Y=Y+7:
Y1=Y1+7
530 GET(X,Y)-(X1,Y1),B,G:PUT(X,Y)-
(X1,Y1),SD,PSET
540 GOTO 320
550 '*****move left*********
560 IF X=<8 THEN X=8:GOTO 320
570 PUT(X,Y)-(X1,Y1),B,PSET:X=X-7:
X1=X1-7
580 GET(X,Y)-(X1,Y1),B,G:PUT(X,Y)-
(X1,Y1),SL,PSET
590 GOTO 320
600 '*****move right********
610 IF X=>225 THENX=225:GOTO 320
620 PUT(X,Y) (Xi,Y1),B,PSET:X=X+7:
X1=X1+7
630 GET(X,Y)-(X1,Y1),B,G:PUT(X,Y)-
(X1,Y1),SR,PSET
640 GOTO 320
650 '*****frog end routine*****
660 PUT(242,177)-(249,184),BL,PSET
670 GET(242.177)-(249.184),FB,G
680 TY=184
690 FOR FX=242 TO X STEP-7
700 PUT(FX,TY)-(FX+7,TY+7),FB,PSET
710 GET(FX-7,TY)-(FX,TY+7),FB,G:PU
T(FX-7,TY)-(FX,TY+7),FL,PSET
720 NEXT FX
730 PUT(FX,TY)-(FX+7,TY+7),FU,PSET
740 FOR FY=184 TO Y+16 STEP-7
750 PUT (FX,FY)-(FX+7,FY+7),FB,PSE
T
760 GET(FX,FY-7)-(FX+7,FY),FB,G
770 PUT(FX,FY-7)-(FX+7,FY),FU,PSET
:NEXT
780 LINE(FX+3,FY-4)-(X+3,Y+3),PSET
:SOUND150,1:LINE(FX+3,FY-4)-(X+3,Y
+3),PRESET
790 PUT(X,Y)-(X+7,Y+7),B,PSET
800 FOR D=0 TO 300:NEXT
810 PLAY"T5O2L4FL2B-L4B-L2FL4FDCDO
1L2B-P4O2L2.B-O3L2DL4O2B-AO3L2C"
820 CLS
830 PRINT@164,"TOO BAD THE FROG GO
T YOU!":PRINT@228,"YOU SCORED";S:P
RINT@292,"DO YOU WANT ANOTHER GAME
?":PRINT@365,"(Y/N)":Q$=INKEY$840
Q$=INKEY$:IF Q$="" THEN 840
850 IF Q$="Y" THEN PLAY "T12"+S$:G
OTO 230:ELSE PLAY E$:CLS:END
860 PUT(X2,Y2)-(X2+7,Y2+7),B1,PSET
:GOTO 310
870 PLAY"V31O1T7L1CL4DD#P4CP4L1F#"
880 SC=SC+1
890 S=SC*28-INT(TI)
900 IF SC=40 THEN R=7:L=5:PLAYW$:G
OTO 240
910 IF SC=30 THEN R=15:L=4:PLAYW$:
GOTO 240
920 IF SC=20 THEN R=20:L=3:PLAYW$:
GOTO 240
930 IF SC=10 THEN R=25:L=2:PLAYW$:
GOTO 240
940 GOTO 310
950 PMODE4,1:PCLS_ 960 ST=1536:T=7
970 FOR CH=0 TO T:RN=INT(CH/32)
980 FOR Y=0 TO 7:READ CD
990 POKE ST+224*RN+CH+32*Y,CD
1000 NEXTY,CH:RESTORE
1010 GET(0,0)-(7,7),SU,G:GET(8,0)-
(15,7),SD,G:GET(16,0)-(23,7),SL,G:
GET(24,0)-(31,7),SR,G:GET(32,0)-(3
9,7),F,G
1020 GET(40,0)-(47,7),FD,G:GET(48,
0)-(55,7),FL,G:GET(56,0)-(63,7),FU
,G:GET(100,100)-(107,107),BL,G:PCL
S
1030 RETURN
1040 DATA 0,195,36,24,126,153,36,6
6
1050 DATA 0,66,36,153,126,24,36,19
5
1060 DATA 68,73,42,28,28,42,73,68
1070 DATA 34,146,84,56,56,84,146,3
4
1080 DATA 36,24,60,90,153,153,165,
195
1090 DATA 165,66,66,60,24,60,90,66
1100 DATA 1,198,41,120,120,41,198,
1
1110 DATA 66,90,60,24,60,66,66,165
1120 STOP
1130 '******DRAW WEBB**********
1140 PCLS
1150 D=1
1160 LINE(235,0)-(235,181),PSET
1170 FOR T=0 TO 23
1180 CIRCLE(0,0),D:D=D+8
1190 NEXT
1200 FOR T=84TO110STEP6
1210 NEXT
1220 X=110
1230 FOR T=5 TO 191 STEP62
1240 LINE(0,0)-(235,T),PSET
1250 NEXT
1260 FOR T=235 TO 0 STEP-62
1270 LINE(0,0)-(T,191),PSET
1280 NEXT
1290 RETURN
1300 PMODE3,1:PCLS
1310 CIRCLE(127,96),30,4,.5:CIRCLE
(127,99),15,4,.5
1320 PSET(122,98,2):PSET(131,98,2)
1330 LINE(127,99)-(127,103),PSET
1340 LINE(100,90)-(80,70),PSET
1350 LINE(100,97)-(60,70),PSET
1360 LINE(60,70)-(90,110),PSET
1370 LINE(109,99)-(94,70),PSET
1380 LINE(94,70)-(74,125),PSET
1390 LINE(80,70)-(40,120),PSET
1400 LINE(154,90)-(174,70),PSET
1410 LINE(154,97)-(194,70),PSET
1420 LINE(194,70)-(164,110),PSET
1430 LINE(145,99)-(160,70),PSET
1440 LINE(160,70)-(180,125),PSET
1450 LINE(174,70)-(214,120),PSET
1460 DRAW"BM82,40;U20D10R10U10D20B
R5U20R10D20U10L10BD10BR15U20R10D10
L10F10BR5U20R10D10L10F10BR12U10H10
BR20G10BR15U10R10BD10L10BD10R10U10
"
1470 DRAW"BM99,140;D20R5U10D10R6U2
0BR5D20R10BU10BL3L7U10R10BR5D20R10
U10L10R7U10L7BR15D20R10U10L10BR6U1
0L6"
1480 SCREEN1,0
1490 PLAY"T5"+S$
1500 RETURN
```

Turtle comes out of its shell

***John Payne** presents a turtle graphics program written in Forth*

TURTLE GRAPHICS is based on the "turtle", which can be told to move forwards or backwards, left or right and various other things. The original "turtle" was a hemispherical shell containing motors and electronics, that was linked by a cable to a computer. By typing commands on the computer, the turtle could be moved around the floor (which really needed to be covered with paper). It had a pen which could be up (not touching the floor) or down (touching the floor) so that as the turtle moved it could draw a line on the floor that showed the path it had followed. Similar turtles are still available.

A later idea was the "screen turtle" which moves around on a television screen instead of on the floor. This program provides turtle graphics based on a "screen turtle" by giving Forth definitions of the words a Turtle should understand.

The Forth definitions are on screens 4 to 16 of the listing. They have been tested and found to work on both Oasis and Dragon Data Forths (However the Dragon Data Forth I used had an error that prevented text being entered to the Forth screens — this error is fixed by HEX 3E4E 4FEC !). The definitions should also work on other versions of Forth if words that calculate sine, draw lines and save screen areas, are defined.

You need to know two things about the turtle: where it is and which direction it's facing. You can tell where it is because it is drawn on the screen (as a right-angled triangle). The pen (which draws on the screen if it is down) is at the right-angled corner of the triangle. The arrowhead shape of the turtle is designed to point in the direction which the turtle is facing, which is the direction it will move when ordered to go forward.

To move in other directions, the turtle must first be turned to face the required direction, and then ordered forward. Bear in mind that the screen is showing the floor, and you are looking at the turtle and floor from above. This means that if, for instance, you order the turtle to turn right 45 degrees, it will turn 45 degrees clockwise.

Once screens 4 to 16 are loaded, you can tell it what to do using the following words:

1) Display Control Words:

↑ *This word switches the display from the text screen (where you type in words) to the graphics screen (which is the floor that the turtle moves around on). This word should be used before a sequence of commands to the turtle, if you want to see the commands being executed.*
Example ↑ 10 FD 90 RT 10 FD
Note: Forth words are not executed until you press the Enter key so all the examples must, of course, be finished by pressing Enter.

← *(Shift ↑). This has the same effect as ↑ except that a different set of colours is used.* ▶

```
SCR # 4
( ### TURTLE GRAPHICS ### )

( COPYRIGHT J. F. B. PAYNE 1983)


FORGET TASK
: TASK ;
-->

SCR # 5
0 VARIABLE PAR
B[ PAR=22161:P1=PAR+1]
: TRANS
B[ A=PEEK(PAR)*256+PEEK(P1)] ;
: REC B[ H=INT(A/256):
L=A-256*H:POKE PAR,H:POKE P1,L
] ;
-->

SCR # 6
: BSIN B[ CF=ATN(1)/45:
A=10000*SIN(A*CF)+.5:?A] ;
: TABLE: <BUILDS 0 DO , LOOP
  DOES> OVER + + @ ;
: SETUP 91 0 DO 90 I - PAR !
TRANS BSIN REC PAR @ LOOP ;
SETUP 91 TABLE: 90SIN
360 CONSTANT 2PI     -->

SCR # 7
: 180SIN DUP 90 > IF MINUS
    180 + ENDIF 90SIN ;
: 2PIMOD DUP 0< IF MINUS 0
     2PI U/ DROP MINUS 360 +
  ELSE 0 2PI U/ DROP ENDIF ;
: SINE  2PIMOD 180 OVER OVER
> IF - 180SIN MINUS ELSE DROP
180SIN ENDIF ;  -->

SCR # 8
: COS 90 + SINE ;
: 2DUP OVER OVER ;
12800 VARIABLE X
9600 VARIABLE Y 0
  1 VARIABLE FTRTL
  VARIABLE ANGLE

: ↑ B[ SCREEN1,0]
5000 0 DO LOOP ;   -->

SCR # 9
: M&S DUP 0< IF MINUS 1
       ELSE 0 ENDIF ;
: 100/ 100 U/ SWAP DROP ;
: */100 M&S >R SWAP M&S >R U*
100/ R> R> XOR IF MINUS ENDIF ;
: NXNY 2DUP COS */100 X @ +
   ROT ROT SINE */100 Y @ + ;
B[ PMODE4]    -->

SCR # 10
: T B[ ?] ;
24 24 SHAPE TSAV
: LHC
2 0 DO 12 - 0 MAX SWAP LOOP ;
: XYSC X @ 0 100/ Y @ 0 100/ ;
: SAVE XYSC LHC TSAV GET ;
: WIPE XYSC LHC TSAV PUT ; -->


SCR # 11
: PAINT PAR 1+ C! PAR C!
B[ PAINT(PEEK(PAR),PEEK(P1))] ;
: SC 0 100/ SWAP 0 100/ SWAP ;
: TURTLE SAVE 10
  ANGLE @ NXNY SC
 2DUP 5 ANGLE @ 90 + NXNY SC
2DUP XYSC LINE,S LINE,S XYSC
LINE,S 3 ANGLE @ 30 + NXNY
SC PAINT ;        -->

SCR # 12
  1 VARIABLE FDOWN
: XYMOV FTRTL @ IF WIPE ENDIF
    FDOWN @ IF 2DUP SC XYSC
    LINE,S ENDIF   Y ! X !
  FTRTL @ IF TURTLE ENDIF ;
: FD ANGLE @ NXNY XYMOV ;
-->


SCR # 13
: RT FTRTL @ IF WIPE ENDIF
ANGLE @ + 2PIMOD ANGLE !
FTRTL @ IF TURTLE ENDIF ;
: LT MINUS RT ;
: BK MINUS FD ;
1 CONSTANT GREEN 4 CONSTANT RED
 2 CONSTANT YELLOW
3 CONSTANT BLUE        -->

SCR # 14
: PAYNT FTRTL @ IF WIPE ENDIF
10 ANGLE @ NXNY SC
PAINT FTRTL @ IF TURTLE ENDIF ;
: CLS B[ PCLS] 12800 X !
9600 Y ! 0 ANGLE ! SAVE
FTRTL @ IF TURTLE ENDIF  ;
-->


SCR # 15
: HIDE FTRTL @ IF WIPE
0 FTRTL ! ENDIF ;
: SHOW FTRTL @ 0= IF TURTLE
1 FTRTL ! ENDIF ;
: PENDOWN 1 FDOWN ! ;
: PENUP   0 FDOWN ! ;
: PEN PAR C! B[ COLOR PEEK(PAR)]
;   -->
```

T — This word switches the display from the graphics screen (where the turtle is) back to the text screen so that you can see what you're typing.
Example T

HIDE — Hides the turtle (makes it invisible) so that it doesn't confuse the picture that it has drawn. Also, although the turtle is no tortoise, it moves even faster when it's invisible.
Example ↑ HIDE

SHOW — Shows the turtle (makes it visible again) so that you can watch what it's doing.
Example ↑ SHOW

2) Movement Words;

FD — Tells the turtle to go forward a given number of steps.
Example ↑ 45 FD moves the turtle forward 45 steps

BK — Tells the turtle to go back a given number of steps.
Example ↑ 73 BK moves the turtle back 73 steps
The screen itself is 255 steps × 191 steps

3) Turning Words:

RT — Tells the turtle to turn to its right (ie, clockwise) by a given number of degrees.
Example ↑ 61 RT turns the turtle 61 degrees to its right

LT — Tells the turtle to turn to its left (ie, anti-clockwise) by a given number of degrees.
Example ↑ 33 LT turns the turtle 33 degrees to its left
Note: these four words are abbreviations, using the first and last letters only, of ForwarD, BacK, RighT, and LefT.

4) Drawing Words:

PENDOWN — puts the pen down so the turtle draws as it moves.

PENUP — picks the pen up, so the turtle leaves no mark as it moves.

PEN, PAPER — are used to say what colour pen and paper are to be used.

GREEN, RED, BLUE, YELLOW, ORANGE, WHITE, CYAN, MAGENTA — are used to specify the colour of pen or paper. Only the first four or the last four of these colours can be used together. The first four are available when you use the word ↑ to switch the display to the graphics screen, the last four are available when ← is used.

CLS — clears the screen (puts a clean sheet of paper on the floor).
Example ↑ GREEN PEN BLUE PAPER CLS makes the turtle draw in green pen on blue paper

Note: The display mode must be correct to allow colour to be used. The mode can be set for colour by typing B[PMODE3]. For higher resolution, in green and black or buff and black only, type B[PMODE4]. The pen colour can be changed at any time and will have an immediate effect. The paper colour can also be changed at any time, but nothing will happen until you start a new sheet of paper using the command CLS.

PAYNT — paints in a shape. Painting starts at the tip of the turtle's nose (the point of the arrowhead) and spreads out until it meets a line the same colour as the paint. The paint colour is the same as the pen colour, so if you draw a shape in RED PEN, then PAYNT it, it will be painted red. If you try to paint a red shape blue, paint will run all over the place!

The turtle remembers numbers, but it executes a word as soon as it comes to it. Therefore, you must first give a number, saying how much you want the turtle to move or turn, and then give the word to move or turn. If you do not give a number before the commanding word, the turtle will invent one — which probably won't be the one you wanted. So take care to put the number first, eg: 10 FD not FD 10.

The turtle recognizes 'words' as collections of characters separated by spaces. Two words not separated by spaces will be treated as one, and the message ERR#0 will be given.

The turtle will get upset if told to move outide the limits of the screen (for instance by ↑ 300 FD). If it's still listening to you, the turtle can be brought back to the centre of the screen, and the screen cleared, using CLS.

The best way to get the turtle to draw what you want, is to build up the picture (or pattern) piece by piece. This can be done by teaching the turtle words which draw simple shapes. These can then be used to teach it words which draw more complicated shapes, and so on until eventually you have a word which draws the whole picture (The word which draws a bunch of flowers [screen#22] shows this nicely):

5) Teaching words:

This word (pronounced "colon") tells the turtle that you are going to teach it a new word, followed by the old words that you want the turtle to carry out when you use the new word.

This word (pronounced "semi-colon") tells the turtle that you've finished the explanation of the new word.

Suppose you want to teach the turtle a new word to make it draw a triangle. If you type in 30 FD 120 RT 30 FD 120 RT 30 FD and finish by pressing the enter key, the turtle will draw a triangle (the word ↑ will show it to you). You can teach the turtle a new word, named 'triangle', which draws a triangle, like this: : TRIANGLE 30 FD 120 RT 30 FD 120 RT 30 FD ;

The turtle will remember the new word 'triangle' and will draw a triangle whenever you use it (To see this, type ↑ TRIANGLE and press the Enter key). You can use any collection of characters you like as the name of a new word, but it makes things easier if you use names that describe the shapes the words draw. You could have typed: : EDITH 30 FD 120 RT 30 FD 120 RT 30 FD; so that ↑ EDITH made the turtle draw a triangle, but this would not be so easy to remember.

You can now draw a more complicated picture using the word 'triangle' in the explanation of another new word. For instance : 3TRIANGLES TRIANGLE TRIANGLE TRIANGLE ; explains a new word named 3TRIANGLES which draws quite a pleasing shape.

Screens 17 to 23 give a demonstration of what you can draw with the turlte.■

```
SCR # 16
 : PAPER   PAR  C!
BE COLOR ,PEEK(PAR)]  ;
5 CONSTANT WHITE  6 CONSTANT
CYAN 7 CONSTANT MAGENTA
8 CONSTANT ORANGE
: ← B[ SCREEN1,1 ]   ;
B[ CLS] ." TURTLE GRAPHICS
  IS LO
ADED" CR          ;S

SCR # 17
." STARTING DEMONSTRATION" CR
: WT 5 0 DO 9999 0 DO LOOP LOOP
; WT B[ ?"HERE IS
  THE TURTLE] WT
 CLS ↑ WT B[ ?"IT CAN BE MOVED
FORWARD] WT ↑ 20 FD WT B[ ?"OR
BACK] WT ↑ 70 BK WT B[ ?"TURNED
LEFT OR RIGHT] WT ↑ 90 LT WT
135 RT WT 90 FD  WT     -->

SCR # 18
B[ ?"AND MOVED FORWARD AGAIN]
B[ ?"IN ORDER TO DRAW PICTURES]
B[ ?"OR GEOMETRICAL FIGURES]
: DIAL 360 OVER / [COMPILE] '
  CFA ROT 0 DO 50
 FD DUP EXECUTE
  12800 9600 XYMOV OVER RT
 LOOP DROP DROP ;
( STK: NO. OF PLOTS ---  ) -->

SCR # 19
: POLYSPI 1 DO I FD DUP LT
LOOP DROP ; ( STK: ANGLE
NO. OF SIDES --- ) WT
." LIKE THIS" CR WT
HIDE CLS ↑ 60 100 POLYSPI
WT B[ ?"WHICH CAN BE PAINTED]
WT ↑ PAYNT CLS 180 LT 144 160
POLYSPI WT     -->

SCR # 20
B[ ?"THE ONLY LIMIT IS YOUR OWN]
." CREATIVITY AND IMAGINATION"
: SQR 10 FD PENDOWN 90 RT 10 FD
 3 0 DO 90 RT 20 FD LOOP 90 RT
10 FD 90 LT PENUP ;    CR
: ASQR 20 FD 45 LT SQR 45 RT ;
WT WT PENUP CLS ↑ 60 DIAL ASQR
30 DIAL SQR PAYNT WT PENDOWN -->

SCR # 21
 : VTRI 3 0 DO DUP FD 120 RT
LOOP DROP ;
: SHELL 120 5 DO I VTRI
5 RT LOOP ; CLS ← 40 LT SHELL
: DIAMOND 2 0 DO DUP FD 30 RT
DUP FD 150 RT LOOP 15 RT PAYNT ;
  : PETALS 6 0 DO DIAMOND
45 RT LOOP ;  -->

SCR # 22
: FLOWER DUP 5 * FD PETALS
DUP 5 * BK 20 RT 2 *
DIAMOND 85 LT DIAMOND
35 RT DROP ;    WT
B[ ?"THIS ONE IS IN COLOUR]
: BUNCH 8 23 DO I 3 MOD 2+ PEN
  I FLOWER 25 RT ANGLE @ 320 >
  IF 110 LT ENDIF -1 +LOOP ; -->

SCR # 23
B[ PMODE3] CLS WT ↑ 90 LT 70 BK
BUNCH WT B[ ?"THAT ENDS THE DEMO
NSTRATION] ." YOU MIGHT LIKE TO
TRY OUT  THE  WORD POLYSPI (SCR#
19) WITH DIFFERENT ANGLES" CR ."
 E.G. TYPE ↑ 72 100 POLYSPI"
CR B[ PMODE4                    ]
CLS SHOW ;S
```


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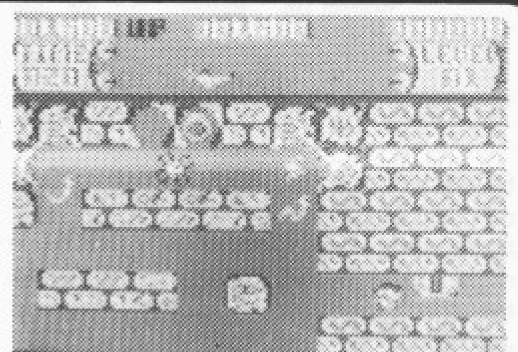
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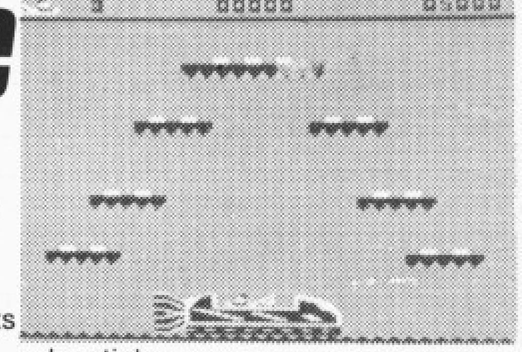
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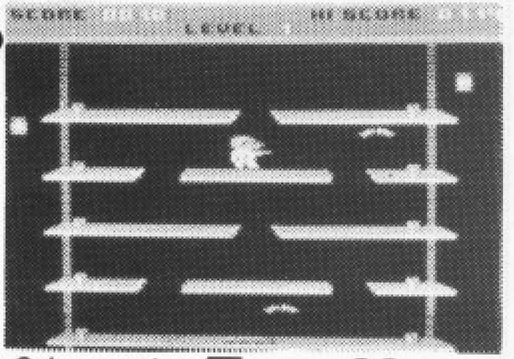
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Build your own drawing arm

***Peter Whittaker** explains how to build a drawing arm*

HERE IS another project for fellow Dragon owners with ham-fisted soldering irons. I have long regarded with jealousy the digitising units or drawing arms available for the Spectrum and BBC micros. I eventually set out to see what I could accomplish with my trusty Dragon.

The 6 bit A/D converter used by the Dragon joysticks splits the reading from a 100K potentiometer into 64 steps (0-63). If the standard 100K pots with 270 degrees of turn are used, there is an angular resolution of about 4.5 degrees per step (270/64). With a drawing arm of 10 inches in length pictures could be copied in blocks of a half-inch-square resolution. This is obviously completely useless. The problem is resolved by using 100K pots with only 30 degrees of rotation. This gives an angular resolution of 0.5 degrees per step, and with a 10 inch arm a copying resolution of 0.1 (1/10) inch squares. This is good enough to be worth doing.

The 30 degree pot does not allow much movement so the positioning of the two arms has to be redesigned. Placing them at right angles (figure 1) gives 30 degrees of movement in both axes. The area covered will not be a perfect square, but a rhomboid. This is because the angle of the second arm to the vertical will vary according to the angle of the first arm (figure 2). However, accurate copying will be achieved within this rhomboid area.

If we take the shoulder as our origin (0,0) the position of the elbow (A,B) can be easily calculated.

A=L★COS(A1)
B=L★SIN(A1)

If the first arm is not horizontal the second arm will not be vertical when it is at right angles to the first arm. The angle of the first arm (A1) needs to be subtracted from the angle of the second (A2) to find its angle to the vertical (figure 3). The position of the "Finger" (C,D) can now be calculated.

C=A+L★SIN(A2−A1)
D=B+L★COS(A2−A1)

If the arms are 10 inches long there will be a range of finger positions from 7 inches to 13 inches along each axis. If this is multiplied by 10 then the equivalent point on the hires screen can be pset (listing 1).

Listing 2 scales up the size of the copy and draws a line from the last point set to the next. By pressing the fire button, the program switches between drawing a line and moving a dot across the screen. Pressing any of the keys 0-8 will set the colour of the line. Pressing the @ key will dump the screen to a Seikosha printer.

To construct the electrical wiring of the drawing arm, the wiring diagram used is exactly the same as that for a joystick (figure 4). Take the joystick unit and with a small screwdriver or penknife bend back the clips which hold the potentiometers in place (figure 5). The assembly will fall apart once the pots have been removed.

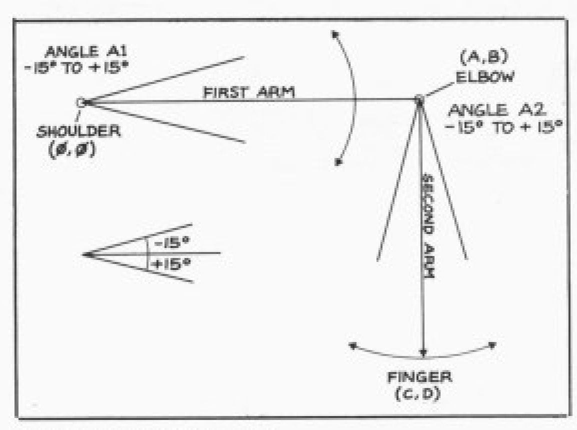


Fig 1 Basic arm design

Fig 2 Area covered by drawing arm

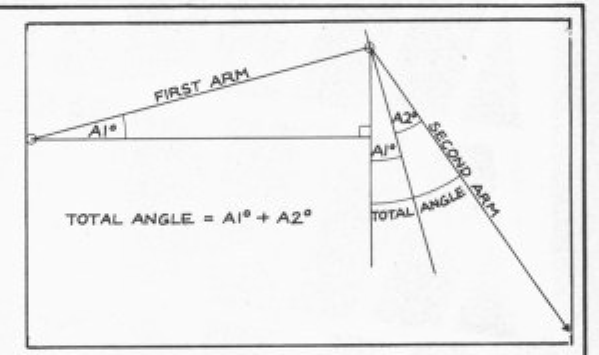


Fig 3 Angle of second arm to vertical

Take the four long pieces of wire and solder one to each of the pins #1,3,4 and 5 of the DIN plug. Solder the extra long wire to pin #2. Now connect and solder wire #1 to the centre leg of pot #1; wire #2 to the centre leg of pot #2 and wire #4 to one leg of the fire button. Use a 12 inch wire to connect the left leg of pot #1 to the left leg of pot #2.

A second 12 inch wire connects this left leg of pot #2 to the spare leg of the fire button, which is then further connected to wire #3 from the DIN plug. Connect wire #5 to the right leg of pot #1, and a 12 inch wire to further connect this leg to the right leg of pot #2. Insulate all connections with tape, and check for short circuits.

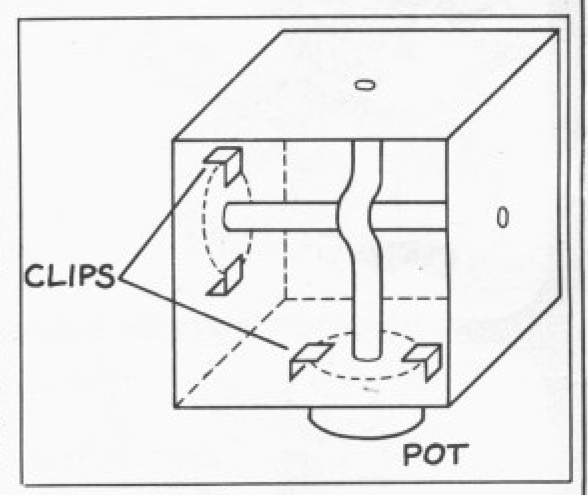


Fig 5 Joystick unit

To construct the drawing arms themselves, obtain two pieces of strip metal (wood, cardboard, or whatever) about 10.5 inches long, and drill a hole at one end of each just big enough to fit over the lug on the potentiometers. Drill a second larger hole at the other end of the first arm (to fit around the back of the lug on the underside of the pot without rubbing).

Plug the DIN plug into the right joystick

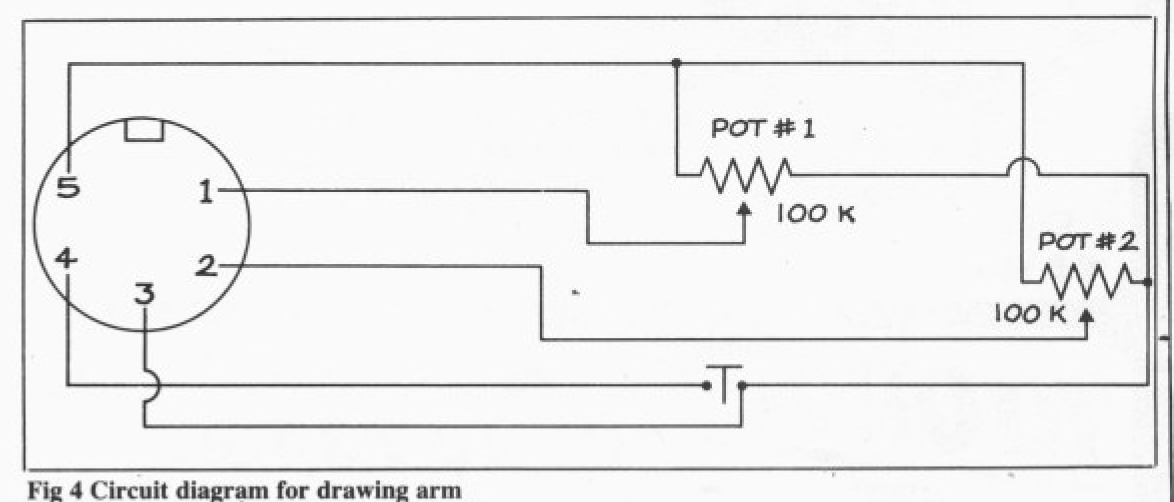


Fig 4 Circuit diagram for drawing arm

:et, type in listing 3 and RUN it. Set ı pot to a value of 31 and then glue an arm on to the lug of each pot. Check to make sure that you can turn it sufficiently to get the full 0-63 range of readings, then glue the back of pot #2 to the end of arm #1 (with the hole in it) making sure that pot #2 can still turn.

Pot #1 can either be permanently fixed to a drawing board, or temporarily stuck to the table with *blu-tack*. If *blu-tack* is used then be careful that moving the arm turns only the potlug and not the whole pot assembly in its *blu-tack* base.

That should be the drawing arm complete. Minor adjustments may have to be made to the program. The ratio of (X−32)/2 for the angle may need slight adjustment depending upon the accuracy of the pots used. The actual length of arms used if not 10 inches each also needs to be taken into account. The programs will run much better if your Dragon can take the speed-up poke (POKE65495,0). ■

Parts list

4 pieces of wire 3 inches long
1 piece of wire 4 inches long
3 pieces of wire 12 inches long
1 of 270 degree 5-pin DIN plug
1 push-button switch
Tandy 275-1547 £1.59 for pack of 5
1 Tandy joystick potentiometer 271-1705 at £2.99

```
10 PMODE4,1:PCLS:SCREEN1,1
20 L=10
30 A1=JOYSTK(0):A2=JOYSTK(1)
40 A1=(A1-31)/2/(180/3.1415926):A2=(A2-31)/2/(180/3.1415926)
50 X=L*(COS(A1)+SIN(A2-A1)):Y=L*(SIN(A1)+COS(A2-A1))
60 X=INT(10*X+0.5):Y=INT(10*Y+0.5)
70 PSET(X,Y,1):GOTO30
```

Listing 1

```
10 L=10:A=2:PMODE3,1:PCLS:SCREEN1,1
20 A1=JOYSTK(0):A2=JOYSTK(1)
30 A1=(A1-31)/2/(180/3.1415926):A2=(A2-31)/2/(180/3.1415926)
40 X=L*(COS(A1)+SIN(A2-A1)):Y=L*(SIN(A1)+COS(A2-A1))
50 X=INT(20*(X-4)+0.5):Y=INT(20*(Y-4)+0.5)
60 A$=INKEY$:IF A$=""THEN 90
70 IF A$>"/"AND A$<":"THEN COLOR VAL(A$):GOTO100
80 IF A$="@"THEN 140
90 IF PEEK(65280)=126 OR PEEK(65280)=254
THEN SOUND100,1:IF A=1 THEN A=2 ELSE A=1
100 ON A GOTO 110,120
110 LINE-(X,Y),PSET:GOTO20
120 P=PPOINT(X,Y):FOR B=1 TO 8:PSET(X,Y,B):NEXT:PSET(X,Y,P)
130 DRAW "BM"+STR$(X)+","+STR$(Y):GOTO20
140 CLS0:PRINT"CHECK PRINTER IS ON AND <ENTER>";:EXEC41194
150 PMODE4,1:SCREEN1,0
160 PRINT#-2,CHR$(13);CHR$(8);CHR$(13)
170 FOR A=0 TO 255 STEP7
180 FOR B=191 TO 0 STEP -1
190 C=128 +PPOINT(A,B)+PPOINT(A,B)*2+PPOINT(A+1,B)*4+PPOINT(A+1,B)
*8+PPOINT(A+2, B)*16+PPOINT(A+2,B)*32+PPOINT(A+3,B)*64
200 PRINT#-2,CHR$(C);CHR$(C);
210 NEXTB:PRINT#-2,CHR$(13);
220 FORB=191 TO 0 STEP -1
230 C=128+PPOINT(A+3,B)+PPOINT(A+4,B)*2+PPOINT(A+4,B)
*4+PPOINT(A+5,B)*8+PPOINT(A +5,B)*16+PPOINT(A+6,B)*32+PPOINT(A+6,B)*64
240 PRINT#-2,CHR$(C);CHR$(C);
250 NEXT B:PRINT#-2,CHR$(13);
260 NEXT A:PRINT#-2,CHR$(13)
```

Listing 2

```
10 CLS0
20 PRINT@32,"POTENTIOMETER CALIBRATION."
30 PRINT@96,"POTENTIOMETER #1";JOYSTK(0)
40 PRINT@160,"POTENTIOMETER #2";JOYSTK(1)
50 IF INKEY$=""THEN30 ELSE END
```

Listing 3

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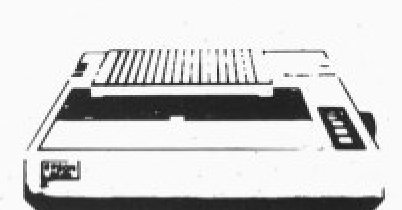
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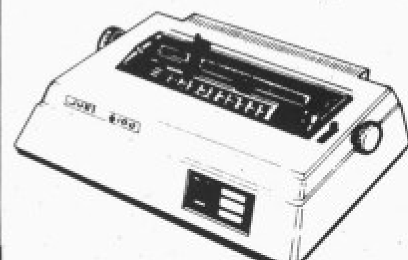


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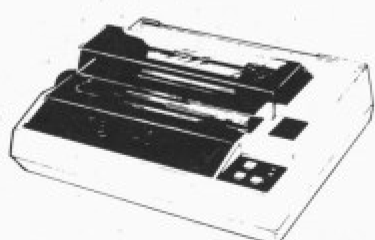
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Jigsaw

From R Whitfield in Bedfordshire

THIS GAME started life as a simple exercise in the use of the Basic commands GET and PUT.

A complete graphics screen is divided into 30 separate blocks — a five by six grid, and each block is then stored using the GET command.

By reservng one-dimensional array for each block instead of the recommended two-dimensional array, the whole graphic screen can be stored in about 25K bytes.

Dragon Basic doesn't allow variables to be used with DIM, GET, PUT, GOTO or GOSUB commands, so each array has to be named separately. A short introduction game has been included but don't be fooled. On loading the screen is filled by the graphics of a car. Parts of the car are moved about the screen and the idea of the game is to return each block of car to its rightful position.

```
10 CLS:PRINT@33,"WELCOME TO"
11 M$="              move it"
12 FOR SL=1 TO 17
13 PRINT@65,RIGHT$(M$,SL)
14 FOR I=1 TO 30:NEXT:SOUND 102,1:
NEXT
15 PRINT@115,"A GAME BASED"
16 PRINT@166 ,"ON THE SLIDING PUZZ
LE."
33 'A SIMPLE GAME USING GET AND  P
UT.  EACH DIM,GOTO,AND GOSUB HAS T
O BE DEFINED.BASIC REQUIRESARRAYNA
MES AND LOCATIONS NOT TO BE A VARI
ABLE.
34 PCLEAR8
35 REM     THE WHOLE SCREEN IS     D
IVIDED INTO 30 BLOCKS.          EA
CH BLOCK BEING HELD IN A     ONE D
IMENSION ARRAY.
36 DIM A1(39),B1(39),C1(39),D1(39)
,E1(39)
37 DIMA2(39),B2(39),C2(39),D2(39),
E2(39)
38 DIMA3(39),B3(39),C3(39),D3(39),
E3(39)
39 DIMA4(39),B4(39),C4(39),D4(39),
E4(39)
40 DIMA5(39),B5(39),C5(39),D5(39),
E5(39)
41 DIMA6(39),B6(39),C6(39),D6(39),
E6(39)
42 REM TWO ARRAYS ARE SET UP'A'
AND 'REF'.THE GAME PLOTS THE  BLOC
KS Actual SCREEN LOCATIONS    AND
COMPARES THEM TO THEIR      REFeran
ce.
43 DIM REF(5,6),A(5,6)
44 S2=1
45 FOR S=1 TO 6:FOR R=1 TO5
46 A(R,S)=S2
47 REF(R,S)=S2
48 S2=S2+1
49 NEXTR,S
50 PRINT:PRINT"WOULD YOU LIKE A SA
MPLE GAME Y/N":SOUND 120,1
51 SA$=INKEY$:IF SA$="" THEN 51
52 IF SA$="Y" THEN G$="1":GOTO 61
53 PRINT@290,"GIVE REQUIRED SKILL
LEVEL 1-4"
54 SA=30
55 SOUND 120,2
56 G$=INKEY$:IF G$=""THEN56 ELSE G
=VAL(G$)
57 IF G>4 OR G<1 THEN G=4
58 CLS0 :PRINT@33,"SELECT A DRAWIN
G ";
59 PRINT@200,"1.CIRCLES";:PRINT@23
2,"2.  CAR  ";:SOUND 130,2
60 G$=INKEY$:IFG$=""THEN60
61 IF G$="1"THEN T=1 ELSE T=2
62 CLS: PRINT@133, "A SIMPLE PICTU
RE WILL BE   DISPLAYED AND THEN SH
UFFLED  FORYOU TO RESTORE. USE THE
 ARROW    KEYS TO MOVE THE YELLOW B
LOCK."
63 'NOW FOR A SIMPLE DRAWING
64 PMODE3,1:PCLS
65 IF T<>1 THEN68
66 CIRCLE(130,90),88,3:PAINT(130,9
0),3,3:CIRCLE(130,90),36,1
67 GOTO72
68 DRAW"S33;C2;BM10,19BD8D3R1E1R3F
4R9E4R3F2R1U5L3D1L11H1U3E1R6H3L13G
2D5G1L1BD5BR2E1R1F1D1G1L1H1U1BR20E
1R1F1D1G1L1H1U1"
69 PAINT(50,50),3,2
70 CIRCLE(40,130),30,4:PAINT(43,12
7),4,4:CIRCLE(204,130),30,4:PAINT(
```

Continued on page 29

```
207,127),4,4:CIRCLE(40,130),15,2:P
AINT(43,127),2,2:CIRCLE(204,130),1
5,2:PAINT(207,127),2,2
71 CIRCLE(215,40),5:CIRCLE(205,20)
,5:CIRCLE(225,60),4,2:CIRCLE(100,5
8),15,4:PAINT(100,58),1,4
72 'THE 30 BLOCKS
73 FOR X=5TO 205 STEP100
74 FOR Y=0 TO 150STEP 60
75 LINE(X,Y)-((X+50),(Y+30)),PSET,
B
76 LINE(X+50,Y+30)-(X+100,Y+60),PS
ET,B
77 NEXT Y:NEXTX
78 LINE(5,0)-(255,180),PSET,B
79 IFT<>1THEN81
80 PAINT(210,160),2,0:PAINT(10,10)
,0,0:PAINT(10,160),3,0:GOTO82
81 PAINT(210,160),2,2
82 FOR D=1 TO 4:PCOPYD TO D+4:NEXT
83 CLS:PRINT@32,"IF YOU WOULD LIKE
 TO BE REMINDED OF THE DRAWING ONC
E IT HAS BEEN SHUFFLED PRESS THE
/' KEY"
84 REM GET EACH BLOCK
85 GET(5,0)-(55,30),A1,G
86 GET(55,0)-(105,30),B1,G
87 GET(105,0)-(155,30),C1,G
88 GET(155,0)-(205,30),D1,G
89 GET(205,0)-(255,30),E1,G
90 GET(5,30)-(55,60),A2,G
91 GET(55,30)-(105,60),B2,G
92 GET(105,30)-(155,60),C2,G
93 GET(155,30)-(205,60),D2,G
94 GET(205,30)-(255,60),E2,G
95 GET(5,60)-(55,90),A3,G
96 GET(55,60)-(105,90),B3,G
97 GET(105,60)-(155,90),C3,G
98 GET(155,60)-(205,90),D3,G
99 GET(205,60)-(255,90),E3,G
100 GET(5,90)-(55,120),A4,G
101 GET(55,90)-(105,120),B4,G
102 GET(105,90)-(155,120),C4,G
103 GET(155,90)-(205,120),D4,G
104 GET(205,90)-(255,120),E4,G
105 GET(5,120)-(55,150),A5,G
106 GET(55,120)-(105,150),B5,G
107 GET(105,120)-(155,150),C5,G
108 GET(155,120)-(205,150),D5,G
109 GET(205,120)-(255,150),E5,G
110 SCREEN1,0
111 GET(5,150)-(55,180),A6,G
112 GET(55,150)-(105,180),B6,G
113 GET(105,150)-(155,180),C6,G
114 GET(155,150)-(205,180),D6,G
115 GET(205,150)-(255,180),E6,G
116 REM MOVE THE BLOCKS
117 X1=5:Y1=6:X=5:Y=6
118 P=-1:FORP2=1 TO 4
119 Q=RND(2):GOTO134
120 NEXT P2
121 IF SA$="Y" THEN SA=1
122 REM MOVE THE BLOCKS AGAIN
123 FOR P=1 TOSA*G
124 Q=RND(4)
125 GOTO134
126 NEXTP
127 K=0
128 REM KEYBOARD COMMANDS
129 A$=INKEY$:IF A$="" THEN129
130 IF A$="/" THEN GOTO185
131 K=K+1
132 IF ASC(A$)=8 THEN Q=1 ELSE IF
ASC(A$)=94 THEN Q=2 ELSE IF ASC(A$
)=9 THEN Q=3 ELSE Q=4
133 SOUND180,1
134 ON Q GOTO 136,137,138,139
135 GOTO 129
136 IF  X-1=0 AND P<SA*G THEN 126
ELSEIF  X-1=0ANDP=SA*G THEN129 ELS
E X=X-1:GOTO140
137 IF Y-1=0 AND P<SA*G THEN126 EL
SE IF Y-1=0 AND P=SA*G THEN129 ELS
E Y=Y-1:GOTO140
138 IF  X+1=6 AND P<(SA*G) THEN126
 ELSE IF   X+1=6 AND P=SA*G THEN 1
29 ELSE X=X+1:GOTO140
139 IF Y+1=7 AND P<SA*G THEN 126 E
LSE IF   Y+1=7AND P=SA*G THEN 129
ELSE Y=Y+1:GOTO140
140 X2=X1*50-45:X3=X1*50+5:Y2=(Y1-
1)*30:Y3=Y1*30:Z= A(X,Y):ON Z GOSU
B 145,146,147,148,149,150,151,152,
153,154,155,156,157,158,159,160,16
1,162,163,164,165,166,167,168,169,
170,171,172,173
141 IF P<0 THEN K2=K2+1:GOTO120
142 IF P<SA*G THEN K2=K2+1:GOTO126

143 IF X=5 AND Y=6 GOTO 174 ELSE 1
29
144 PUT(X*50-45,(Y-1)*30)-(X*50+5,
Y*30),E6,PSET:A(X1,Y1)=A(X,Y):A(X,
Y)=30:X1=X:Y1=Y:RETURN
145 PUT(X2,Y2)-(X3,Y3),A1,PSET:GOT
O144
146 PUT(X2,Y2)-(X3,Y3),B1,PSET:GOT
O144
147 PUT(X2,Y2)-(X3,Y3),C1,PSET:GOT
O 144
148 PUT(X2,Y2)-(X3,Y3),D1,PSET:GOT
O144
149 PUT(X2,Y2)-(X3,Y3),E1,PSET:GOT
O144
150 PUT(X2,Y2)-(X3,Y3),A2,PSET:GOT
O144
151 PUT(X2,Y2)-(X3,Y3),B2,PSET:GOT
O144
152 PUT(X2,Y2)-(X3,Y3),C2,PSET:GOT
O144
153 PUT(X2,Y2)-(X3,Y3),D2,PSET:GOT
O144
154 PUT(X2,Y2)-(X3,Y3),E2,PSET:GOT
O144
```

Continued on page 31

```
155 PUT(X2,Y2)-(X3,Y3),A3,PSET:GOT
O144
156 PUT(X2,Y2)-(X3,Y3),B3,PSET:GOT
O144
157 PUT(X2,Y2)-(X3,Y3),C3,PSET:GOT
O144
158 PUT(X2,Y2)-(X3,Y3),D3,PSET:GOT
O144
159 PUT(X2,Y2)-(X3,Y3),E3,PSET:GOT
O144
160 PUT(X2,Y2)-(X3,Y3),A4,PSET:GOT
O144
161 PUT(X2,Y2)-(X3,Y3),B4,PSET:GOT
O144
162 PUT(X2,Y2)-(X3,Y3),C4,PSET:GOT
O144
163 PUT(X2,Y2)-(X3,Y3),D4,PSET:GOT
O144
164 PUT(X2,Y2)-(X3,Y3),E4,PSET:GOT
O144
165 PUT(X2,Y2)-(X3,Y3),A5,PSET:GOT
O144
166 PUT(X2,Y2)-(X3,Y3),B5,PSET:GOT
O144
167 PUT(X2,Y2)-(X3,Y3),C5,PSET:GOT
O144
168 PUT(X2,Y2)-(X3,Y3),D5,PSET:GOT
O144
169 PUT(X2,Y2)-(X3,Y3),E5,PSET:GOT
O144
170 PUT(X2,Y2)-(X3,Y3),A6,PSET:GOT
O144
171 PUT(X2,Y2)-(X3,Y3),B6,PSET:GOT
O144
172 PUT(X2,Y2)-(X3,Y3),C6,PSET:GOT
O144
173 PUT(X2,Y2)-(X3,Y3),D6,PSET:GOT
O144
174 REM CHECK IF DONE
175 FOR S=1 TO 6:FOR R=1 TO 5
176 IF A(R,S)=REF(R,S) THEN NEXT R
,S ELSE 129
177 CLS:PRINT @ 265,"**** DONE ***
*"
178 FOR S=1 TO 10
179 SCREEN1,0:SOUND 120,2 :SCREEN
0,1:SOUND 120,2:NEXT
180 CLS:PRINT@129,"DONE IN";K;"MOV
ES THE COMPUTER          MADE"K2+1;
"SHUFFLES":IF SA$="Y" THEN PRINT @
260,"NOW FOR A GAME Y/N" ELSE PRIN
T@260,"AGAIN Y/N"
181 SA$="":K=0:K2=0
182 Z$=INKEY$:IF Z$="" THEN 182
183 IF Z$="N" THEN CLS0:NEW
184 CLS:GOTO53
185 PMODE3,5:SCREEN1,0
186 FOR D=1 TO 800:NEXTD
187 PMODE3,1:SCREEN1,0
188 GOTO129
```

Rotator

From Neil Blagden in Norfolk

MY PROGRAM for the Dragon 32 is a three-dimensional rotator, showing the principle of rotating a symmetrical shape in three dimensions.

It is not a real rotator as two points remain fixed, however, it looks as if the whole shape is rotating. You are given the option of rotating a cube or a pyramid.

I use PCLS instead of PRESETing each line, as when clearing many lines, PCLS is faster and therefore gives a smoother display, rather than clearing each line separately. The speed-up poke (POKE 65495.0) is used in lines 260 and 530. If your Dragon crashes when these are used, simple delete these two lines, though the graphics are not as fast or as smooth.

Program notes

10-140	Title: Rem's
150-240	Instructions
250	Input cube or pyramid
520-780	Drawing and rotation of cube

```
10 '**************
20 '**3D*ROTATOR**
30 '**N.BLAGDEN***
40 '**************
50 'TITLE
60 CLS0
70 L=RND((6)+1)*16
80 PRINT@44,CHR$(140+L)+CHR$(140+L
)+CHR$(141+L)+CHR$(128)+CHR$(142+L
)+CHR$(140+L)+CHR$(137+L);
90 C=RND(3)*16
100 PRINT@76,CHR$(140+L)+CHR$(140+
L)+CHR$(141+L)+CHR$(128)+CHR$(138+
L)+CHR$(128)+CHR$(133+L);
110 PRINT@72+36,CHR$(131+L)+CHR$(1
31+L)+CHR$(135+L)+CHR$(128)+CHR$(1
39+L)+CHR$(131+L)+CHR$(134+L);
120 PRINT@172,"rotator";
130 PRINT@172+64,"any"+CHR$(128)+"
key";
140 IF INKEY$="" THEN 70
150 CLS:PRINT"        3D ROTATOR IS
 A THREE       DIMENSIONAL SIMULATI
ON  OF A  SPINNING   CUBE     OR
 PYRAMID (DEPENDING ON WHICH YOU W
ILL   ENTER)YOU  CAN  START  AND S
TOP ROTATION USING THE SPACE BAR,S
O IF YOU PRESS THE SPACE"
160 PRINT@426,"ANY KEY"
170 IF INKEY$="" THEN 170
180 CLS
190 PRINT"BAR ONCE,AND THEREAFTER
TWICE   QUICKLY,IT IS POSSIBLE TO
FLICK THE MOVEMENT THROUGH EACH'FR
AME'SEPERATELY:IF YOU PRESS'C'WHIL
E THE PYRAMID IS ROTATING ,IT WILL
 SWAP TO A CUBE,AND IF YOU PRESS'P
  WHILE THE CUBE IS ROTATING  IT W
ILL SWAP TO"
200 PRINT@241,"A PYRAMID"
210 PRINT@429,"ANY KEY"
230 IF INKEY$="" THEN 230
```

Continued on page 33

```
240 'INPUT CUBE OR PYRAMID
250 CLS:PRINT@70,"CUBE OR PYRAMID"
;:INPUT A$:IF LEFT$(A$,1)="C" THEN
 CLS:PRINT@77,"CUBE":FOR I=0 TO 80
0:NEXT:GOTO520ELSE CLS:PRINT@75,"P
YRAMID":FOR I=0 TO 800:NEXT
260 POKE65495,0
270 PMODE4,1:SCREEN1,1:COLOR0,5:PC
LS
280 'PYRAMID
290 LINE(150,50)-(120,90),PSET
300 J=90:M=180:O=90
310 LINE(150,50)-(180,90),PSET
320 DRAW"BM120,90;R60"
330 FOR P=120 TO 180 STEP2
340 IF INKEY$="C" THEN 520
350 LINE(150,50)-(120,90),PSET
360 'DRAWING & ROTATION
370 LINE(150,50)-(180,90),PSET
380 LINE(180,90)-(P,O),PSET
390 LINE(120,90)-(P,O),PSET
400 LINE(150,50)-(P,O),PSET
410 IF P<150 THEN O=O+1 ELSE O=O-1
420 M=M-2
430 IF P<150 THEN J=J-1 ELSE J=J+1
440 LINE(120,90)-(M,J),PSET
450 LINE(180,90)-(M,J),PSET
460 LINE(150,50)-(M,J),PSET
470 IF INKEY$=CHR$(32)THEN 480 ELS
E 490
480 IF INKEY$<>CHR$(32) THEN 480
490 PCLS
500 NEXT
510 GOTO300
520 PMODE4,1:SCREEN1,1:COLOR0,5:PC
LS
530 POKE65495,0
540 J=90:M=155:O=90
550 'CUBE
560 FOR P=120 TO 155 STEP2
570 IF INKEY$="P" THEN 280
580 LINE(155,90)-(155,70),PSET
590 'DRAWING & ROTATION
600 LINE(P,O)-(P,O-20),PSET
610 LINE(120,90)-(120,70),PSET
620 LINE(M,J)-(M,J-20),PSET
630 LINE(M,J-20)-(120,70),PSET
640 LINE-(P,O-20),PSET
650 LINE-(155,70),PSET
660 LINE-(M,J-20),PSET
670 LINE(M,J)-(120,90),PSET
680 LINE(120,90)-(P,O),PSET
690 LINE(P,O)-(155,90),PSET
700 LINE(155,90)-(M,J),PSET
710 IF P<137 THEN O=O+1 ELSE O=O-1
720 M=M-2
730 IF P<137 THEN J=J-1 ELSE J=J+1
740 IF INKEY$=CHR$(32) THEN 750 EL
SE 760
750 IF INKEY$<> CHR$(32) THEN 750
760 PCLS
770 NEXT                    780 GOTO540
```

Keybeep

From Stephen Young in Essex

THIS SHORT machine code program is in response to P A Norris's request (*Dragon Answers,* May) for a routine to activate/deactivate the keybeep routine.

It works by diverting the character feed routine located at £009F to a short routine which checks to find if the characters from the feed routine are either KS — keysound, or KQ — keyquiet. If so, the routine acts accordingly by turning the beep routine on or off.

If the characters from the feed routine are not KS or KQ, then they are passed on to the Basic interpreter to be executed normally. As the original keybeep routine remains unchanged in the same location as for G D Snooks' original contribution, it is probably best to reiterate the warning to disconnect a printer if you have one before activating the program.

Dragon Users with the original contribution on tape (*Dragon User,* Open File, October 1983) should be able to save some typing, although the complete program is listed here for ease of entry. Once the program has been entered, it can be saved as a machine code file:

CSAVEM "KEYBEEP", &H7FFF, &H7F71

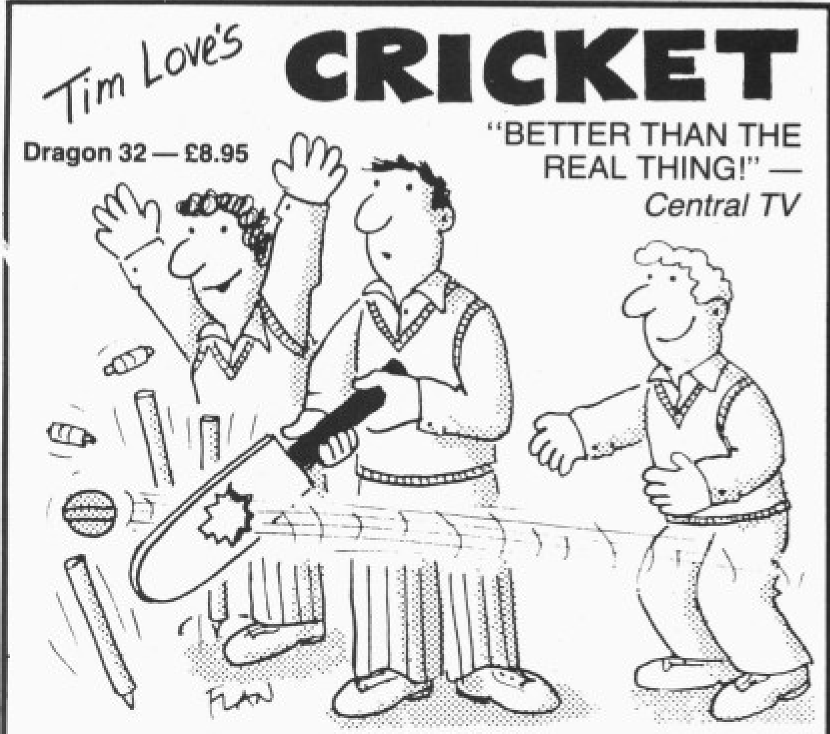
A small amount of space should be cleared after loading, that is CLEAR 200, &H7F70 before the program can be called using EXEC &H7F71. This only needs to be done once after loading and from then on your Dragon has increased its vocabulary by two words.

```
10 '''''''''''''
20 '  KEYBEEP  '
30 '   MK II   '
40 '''''''''''''
50 CLEAR 200,&H7F70
60 DATA 86,B9,B7,01,6C,86,7E,B7
70 DATA 00,A8,86,7F,B7,00,A9,86
80 DATA 86,B7,00,AA,39,81,4B,26
90 DATA 1C,DC,A6,C3,00,01,DD,A6
100 DATA A6,9F,00,A6,81,53,27,10
110 DATA 81,51,27,14,DC,A6,83,00
120 DATA 01,DD,A6,86,4B,7E,BB,26
130 DATA CC,7E,7F,FD,01,6A,0E,9F
140 DATA CC,39,7F,FD,01,6A,0E,9F
150 DATA 34,36,8E,00,01,10,8E,00
160 DATA 01,30,01,86,E0,B7,FF,20
170 DATA 7F,01,12,7F,01,13,B6,FF
180 DATA 23,8A,08,B7,FF,23,B6,FF
190 DATA 01,84,F7,B7,FF,01,B6,FF
200 DATA 03,84,F7,B7,FF,03,73,FF
210 DATA 20,34,10,30,1F,26,FC,35
220 DATA 10,10,BC,01,12,2D,EF,8C
230 DATA 00,70,26,C5,35,36,39
240 FOR N=&H7F71 TO &H7FFF
250 READ A$:POKE N,VAL("&H"+A$):NE
XT
260 EXEC &H7F71
```

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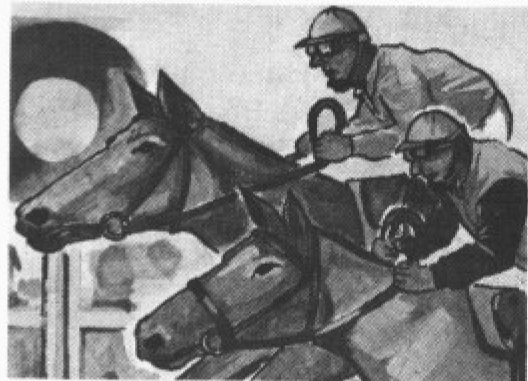


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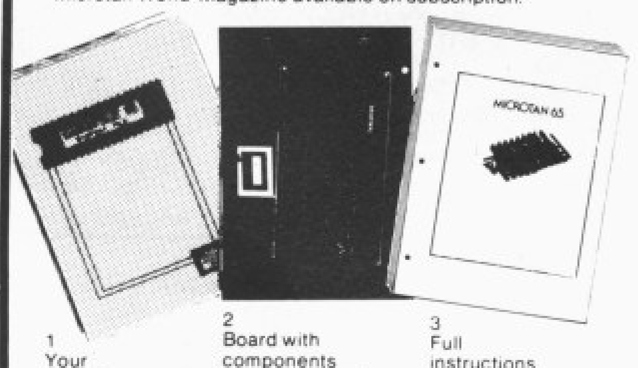
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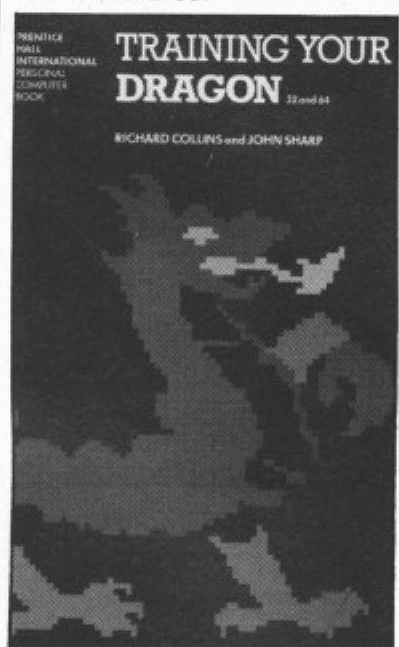
Bookbytes

Send books for review to *Dragon User*, 12/13 Little Newport Street, London WC2R 3LD.

Book: *Training Your Dragon*
Authors: Richard Collins and John Sharp
Publisher: Prentice-Hall International
Price: £7.95

IT IS unfortunately true that most computer manuals leave a lot to be desired. This is not always the writer's fault, as he/she often has to use a prototype machine that is nothing like the finished article. Manufacturers are notorious for their changes, both up to and beyond the launch of the new computer. This provides other authors with the opportunity to delve into different aspects of the machine that the manual has failed to cover.

The Dragon has been luckier than most in not altering its configuration, but the manual itself came in for a certain amount of criticism at the launch in not providing enough clear explanation for the first-time user. *Training Your Dragon* aims to help the beginner get to grips with his machine although more experienced users may like the detailed explanations of some of the features.



In 25 chapters, the book ranges from beginner's Basic, through graphics and sound up to a brief explanation of machine code. There are many short programs scattered through the text to explain particular points, and the occasional diagram to illustrate the text. The style is friendly, if rather serious, but has a tendency to become rather wordy in places.

The chapter on editing is well presented and will encourage any reader to spend more time on learning to use what is one of the Dragon's finer points. Many users never become familiar with some of the editing commands which are well worth the trouble of learning.

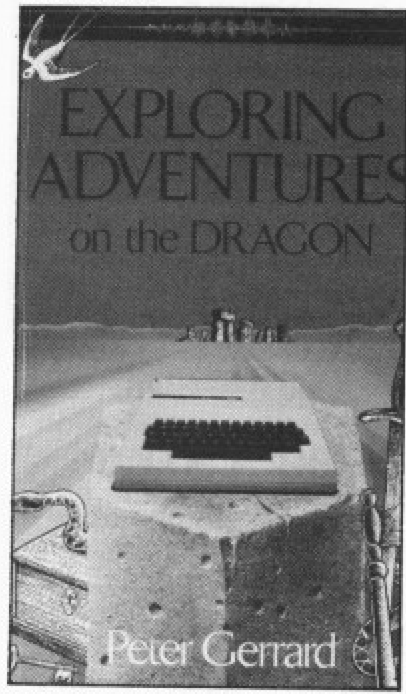
Another part of the book I particularly liked was the large section dealing with graphics techniques. There are eight chapters on this subject and in some ways there is too much detail here. The novice is likely to find it rather overwhelming, as you have to read pages and pages of text before you actually discover how to do anything. For someone who has spent some months puzzling over the manual, however, it is pitched just about right. You will find new ideas that are not available elesewhere, but you do have the advantage of having them all together in one volume.

I am surprised to see this book appears so long after the launch of the Dragon, and in some ways the publishers have probably left it too late for this book to sell well, which is a pity as it is obviously the result of some hard and careful work. If you are new to the Dragon and can't find a copy of *Going Ahead With Colour Basic* from your local Tandy shop (still my favourite introductory Dragon/Colour Computer Book) then you could do worse than buy *Training Your Dragon.*

John Scriven

Book: *Exploring Adventures on the Dragon*
Author: Peter Gerrard
Publisher: Duckworth
Price: £6.95

PETER GERRARD, author of several books on the Commodore computers, has now turned his attention to the Dragon with this book for would-be adventure game programmers. The book betrays its Commodore origins in places, with references to the desirability of using lower-case text and selection of screen and border colours, both unavailable on the Dragon, but the program listings have fortunately been edited more thoroughly than the text, and should run satisfactorily on the Dragon if you have the energy to type them in. (If you don't you will be relieved to know that a cassette version is available).



Three complete adventure games, all written in Basic to the same format, are provided, and there is a line-by-line explanation of one of the listings. The idea is that a careful study of this listing should enable you to write your own games along similar lines. The author has thoughtfully provided some skeleton plots as well, for those readers whose programming skill exceeds their inventiveness.

The book also contains a section on the history and development of adventure games, with detailed descriptions of the original Adventure and some of the Scott Adams adventures (not, as far as I know, available on the Dragon) and a rather unnecessary section on elementary programming.

It's by no means the worst computer book I've seen, but you'd do better to spend your money on a subscription to an adventure magazine.

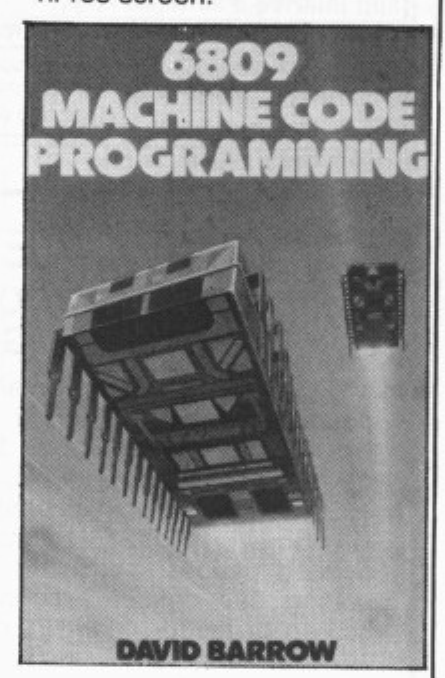
Margaret Norman

Book: *6809 Machine Code Programming*
Author: David Barrow
Publisher: Granada
Price: £7.95

THERE IS no shortage of books about machine code on the Dragon — some are good, some are bad, *6809 Machine Code Programming* by David Barrow is, despite its unoriginal title, one of the better ones.

The book starts off assuming no previous knowledge of machine code and tries to eliminate some of the myths which surround this language. Chapter two is rather boldly entitled "How to Write machine code programs", in it David introduces the principles of structured programming, including flow charts, documentation and debugging.

6809 Machine Code Programming is designed principally to be a collection of program subroutines which are both useful and also serve to introduce the concepts of programming in the computers' native language. Subsequent chapters deal with number crunching, the Dragon's support chips, high resolution graphics and sound. Particularly interesting is chapter seven, which includes a program to display full upper and lowercase characters on the hi-res screen.



All of the routines are excellently documented and much useful information can be found within them for the newcomer. Although some technical information is given, it would have been nice to see a decent memory map, and perhaps a list of useful ROM routines.

There are a number of useful appendices covering 6809 architecture and assemblers. If you're looking for a book on 6809 machine code with references to the Dragon then this is worth considering. What it lacks in technical information, it makes up for in its general approach.

Brian Cadge

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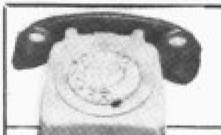
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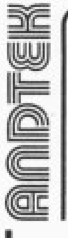
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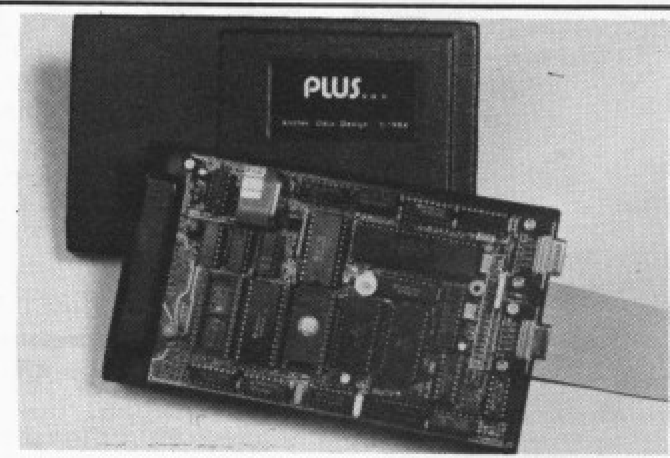
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If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Perfect harmony

I HAVE noticed on some of my games tapes that the accompanying music is played in harmony (that is, more than one note at a time).

I have never seen any information on how this is achieved and would be most grateful if you could enlighten me.

F W Robinson
Brimington
Chesterfield

THIS type of music is only available by using machine code routines which are not particularly easy to write. A program called "The Composer" is available from Microdeal which allows you to enter music in four voices in simple note form. The program will then create a machine code routine which you can save and use in your own Basic programs.

Composer costs £15 and is available from Microdeal at 41 Truro Road, St Austell, Cornwall, PL25 5JE.

Connect a cassette

IS IT possible to connect an ordinary cassette microphone (with cassette jack-plug) to the joystick port of the Dragon 32? If so, which pins should I connect the two halves of the jack-plug to? I hope to use the microphone input in a speech-recognition program, by reading the value of the joystick port from Machine Code.

Darren Cocking
Coventry
West Midlands

THE short answer is NO. The joystick ports are D/A devices which output voltage — this could damage your microphone and any other device you plug in. Joysticks, lightpens and so on give a resistance value which can be detected by the ROM routine which compares the voltage sent out to that coming back.

You would do better to connect your microphone via an amplifier (such as a cassette recorder) to the tape socket on the Dragon.



Making more memory

I HAVE just recently purchased a Dragon Data disk drive and found out that because the disk cartridge takes up the first page of graphics memory, I could not get some of my programs to either load or run.

This is very annoying as every time I want to load my favourite game, I have to take out the disk cartridge. Are there any machine code routines or pokes that I may enter before loading?

Sandy Munro
Inverness

IT IS possible to "unplug" the dos cartridge by using software, so the computer thinks it isn't there. The program to do this is too long to list here, but is fairly simple to write given the following information.

You need to copy the Basic boot program from ROM to RAM, this starts at address 46010. You then need to change this so that it doesn't check for the dos cartridge (it does this by looking to see whether the first two bytes at 49152/3 are 'DK'). Finally you need to manually set the top of memory pointers and rerun your modified bootup program in RAM.

To return to the dos, simply type POKE 113,0 and press reset.

Graph equation

I HAVE owned my Dragon 32 for some months now and have been buying your magazine *Dragon User*. In it, I have seen, on an advertisement for a printer, a graph drawn.

I would like to be able to enter an equation and have it plotted on a graph. Please can you show me a program that will do this.

Tracy Stewart

THE functions SIN, COS, and TAN are useful for drawing the type of graphs you describe. The particular graph shown in the advert you refer to is a simple sine graph, which can be drawn with the following short program:

```
10 PMODE 4,1 : COLOR 0,1 :
   PCLS : SCREEN 1,1
20 FOR X = 0 TO 255
30 Y = SIN(X/256*6.282)*90
   +96
40 PSET(X,Y): NEXT X
50 GOTO 50
```

Print m/c numbers

I HAVE two questions I would like to ask you:
(1) How do you achieve CLOAD and CLOADM in machine code?
(2) How do you print numbers in machine code as JSR &HB54A only prints a letter?

David Hedley
Norfolk

TO access CSAVEM set up the filename in loc. 474-481, then:

```
LDX #return adrs to prog
PSHS X
LDX #start of data
STX 487
LDX #end of data
PSHS X
LDX #entry adrs
PSHS X
STX 485
JMP 39195
```

To access CLOADM use JSR 41106.

To print a 16 bit number in the 'D' register to the screen use:

```
CLR 111
JSR 38266
```

and to the printer use:

```
LDA #254
STA 111
JSR 38266
```

Tandy interface

I HAVE had a Dragon 32 for about one and a half years and am thinking of buying a Tandy TP-10 printer, but have heard that it is incompatible.

Can I modify this printer to work with the Dragon, and if so, can you show me the connections between a five-pin din plug and a parallel plug. I would like to make my own lead as ready-made leads are expensive.

Nicky Alford
West Midlands

THE Tandy TP-10 is not compatible with the Dragon as it has only a serial interface and the Dragon requires a parallel interface. It is certainly not possible to connect the two directly and as far as I know there is no interface available to do this. The printer is designed only to be used with the Tandy Coco.

VARPTR and USR

PLEASE tell me how to call machine code routines from a Basic program using DEF USR?

Also, could you explain VARPTR, how it is used and what it is used for.

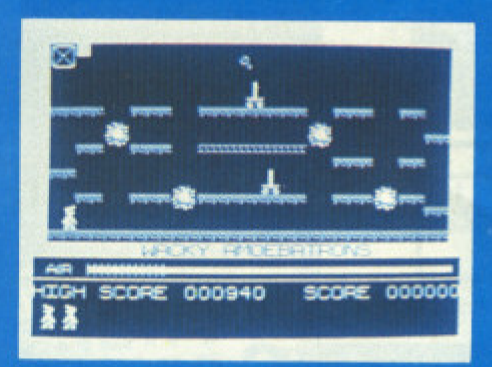
Richard Craig
Ballymena

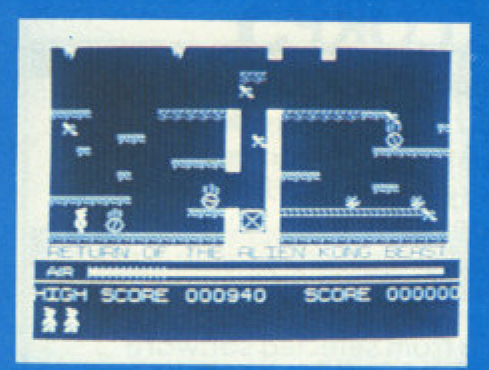
THE USR command can be used when your machine code routine needs to pass values to and from Basic. If your routine starts at address 32000, then the USR address is set up as follows:
DEF USR5 = 32000

To call your routine and pass a variable to it use:
X = USR05 (VARPTR(X$)) (Dragon 32)
X = USR5 (VARPTR(X$)) (Dragon 64)

VARPTR returns a 16 bit address of the variable pointer, this can be returned in the D register if your program uses JSR 35623. Then [D] will be the length of the sting X$, and [D+2] will be the address of the start of the string.







MANIC MINER

Miner Willy, while prospecting down Surbiton way stumbles upon an ancient, long forgotten mineshaft. On further exploration, he finds evidence of a lost civilisation far superior to our own, which used automatons to dig deep into the Earth's core to supply the essential raw materials for their advanced industry. After centuries of peace and prosperity, the civilisation was torn apart by war, and lapsed into a long dark age, abandoning their industry and machines. Nobody, however, thought to tell the mine robots to stop working, and through countless aeons they had steadily accumulated a huge stockpile of valuable metals and minerals, and Miner Willy realises that he now has the opportunity to make his fortune by finding the underground store. In order to move to the next chamber, you must collect all the flashing keys in the room while avoiding nasties like Poisonous Pansies and Spiders and Slime and worst of all, Manic Mining Robots. When you have all the keys, you can enter the portal which will now be flashing. The game ends when you have been 'got' or fallen heavily three times.

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AFTER LAST month's goodies, with The Hulk and the first in the Mysterious Adventures series, it's rather a quiet time, which should at least be good news for everyone's pockets. If you do have money to spend, though, then Channel 8 continues to churn out Dragon conversions of the Mysterious Adventures, of which there will be 11 in total, and at £9.95 a time it makes you glad to be a reviewer.

I had been hoping to run through the Mysterious Adventures in order, but they are arriving rather haphazardly, the most recent to turn up being their latest title, Waxworks (number 11). Before that however, I had an opportunity to look at number five in the series, Feasibility Experiment — not a Brian Howarth solo this time but written jointly with Wherner Barnes. The format is the same for all the series I've seen so far: a text-only 32 version and a graphics 64 version on the same tape, a pleasantly re-defined character set, with the top quarter of the screen taking care of the description, visible objects and exits, and your commands and the responses scrolling up in the bottom three-quarters of the screen.

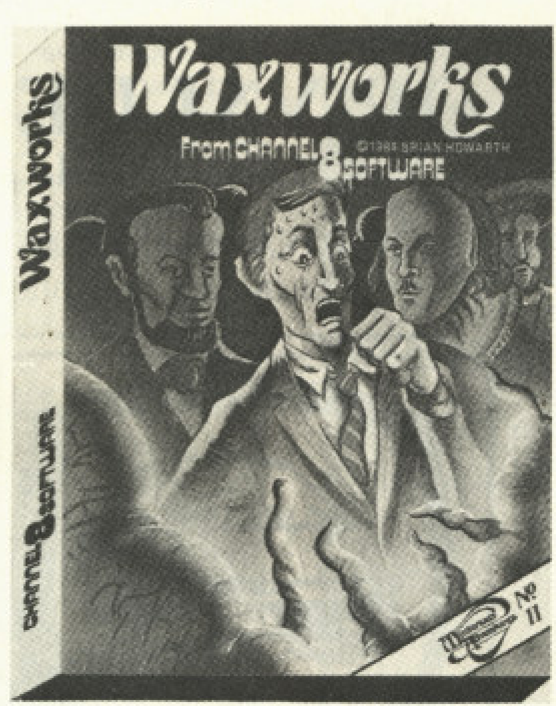
Feasibility

From the blurb it would seem that **Feasibility Experiment** is a sci-fi type of story: "Far beyond the outermost Galaxy of our universe, beyond the wildest imaginings of mortal man lies a newly born World." It has been built by beings who have no physical form but are merely clouds of pure mental energy. So where does Fred Bloggs, humble Dragon owner from Stoke Poges come into this?

It seems things have gone wrong on this world and they need a Superhero from Earth as a sustaining life force, and you have been whisked away to wake up in an old mansion, not realising you are undergoing the experiment of the title to see if you are a worthy Superhero. Come on Fred, you can do it! You have 700 turns, with a soft voice regularly whispering how many you have left.

Going East takes you into a Viewing Room, through the window of which you can see a pride of lions. Funny, I thought. A little further on I wandered down a tunnel and came out in an arena where a lion proceeded to rip me apart. Not so funny, I thought. The sword I had found didn't seem to have much effect on the ravenous lion, but after a wander round a maze of tunnels I found a means of defence enabling me to get safely through the arena, when I found myself in the Emperor's Box — I made a polite enquiry and was attacked by his guards. Charming.

Travelling the other way leads to grassy plains and mountain paths with several objects, including the odd treasure, which is what you are looking for. Collecting the treasures proves your heroic qualities. The standard of this series is fairly consistent as regards toughness, and also as regards the fairly terse descriptions: "I'm in a weapons room," and "I'm in a tunnel" and so on. Feasibility Experiment didn't appeal to me as much as some of the others because of its rather disjointed nature, although this is part of the overall idea. If you like the series, however, then it shouldn't disappoint.



Preferable for me was the new title, **Waxworks**. Here, you wake up in the leisure lounge of a deserted waxworks. Moral: if you want to stay out of trouble, don't fall asleep. You always wake up somewhere strange. This place is even stranger as you're not told what you're meant to be doing. The cassette comes with a leaflet giving you the outlines for the first 10 adventures in the series, but not the eleventh. No wonder they call them Mysterious.

All that the first screen tells you is "I remember coming to the Waxworks . . . I must have slept. The place is dark! It's Spooky! What now?" What indeed? Well you can start by examining the wooden beam, the public telephone, the old fashioned slot machine and the seating around the leisure room, before wandering off to check out the exhibits of the Grand Hall. This must be the first adventure where you can utilise the command EXAMINE JACQUES COUSTEAU.

Scuba Gear

In front of this exhibit you're asked a riddle, and though I've given the right answer it doesn't seem to have done me much good yet . . . I couldn't persuade old Jacques to hand over his scuba gear, which would surely come in handy in the large aquarium tank where you come to grief in the teeth of Jaws IV. There's another exhibit covering the ascent of Everest, and other features include a series of old sewers full of rats, a baited rat-trap, but no visible means of escape, and a maze in the Hall of Mirrors which needs to be thoroughly tested and investigated as it leads to more than one place. Waxworks might be a bit more expensive than a visit to Madame Tussaud's, but I can guarantee it'll last longer.

Finally this month a query from a reader who recently bought the graphics version of **Calixto Island** from Dragon Data. Alan Gaynor of London SW2 says that he loves the graphics, but unfortunately can't get out of the first few locations. He read in a review that the adventure opens up when you make your way to Professor Lagarto's secret laboratory, but the laboratory's proving a little too secretive for Alan. This is one of those occasions where looking once at an object is not enough, you have to look twice. And if you want a clue as to which object, all I'll say is that Mrs Thatcher's got one.

If other readers have any queries then I'll try to help if I can, and in the spirit of mutual co-operation that seems to exist amongst adventurers, if anyone out there has completed **Madness and the Minotaur** I'd be glad if they could spare a minute or two to write to me.■

Each month Mike Gerrard will be looking at adventures for the Dragon. If you have an adventure you want reviewed or you need advice or have some to offer write to Mike Gerrard's Adventure Trail at *Dragon User*.

The *Dragon User* discount club will save you money. Software companies interested in joining the scheme should write to: *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD.

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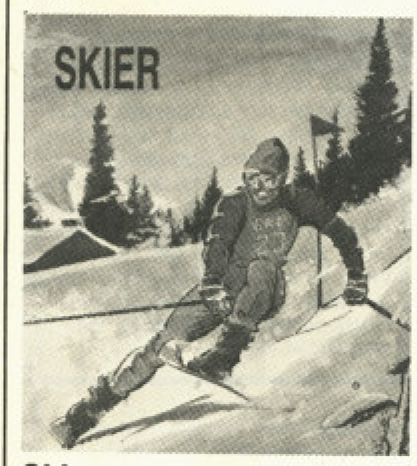
Discount software is now available through the medium of the Dragon User club – this month save £1.50 on each of these games and adventures from Computer Rentals

THE *Dragon User* Discount Club is designed to save you money. This month's special offer, which is only open to readers of this magazine, features six software titles for the Dragon 32 from Computer Rentals. Each game has been reduced to £5.45, down from £6.95. To order your game(s) simply cut out the coupon on this page and send it, together with a cheque or postal order, to: *Dragon User* Discount Club, 12-13 Little Newport Street, London WC2R 3LD.



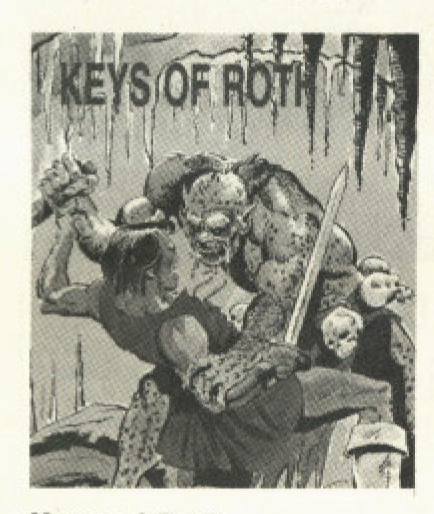
Froglet

A busy main road and a fast flowing river are the obstacles you must overcome in guiding the Froglet family back to the safety of their home. The better you get, the harder the task.



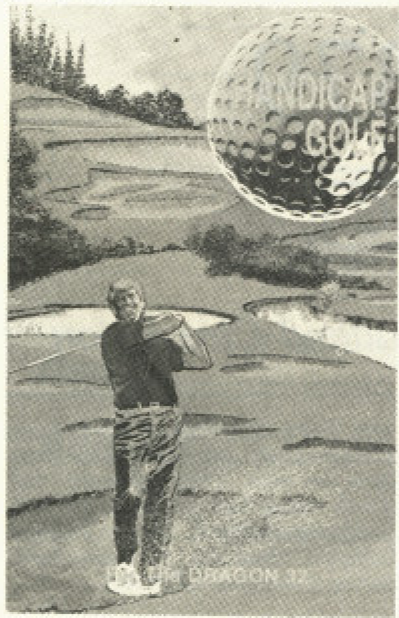
Skier

Try your hand at skiing down a giant slalom run, negotiating a series of slalom gates and avoiding the trees. The program is a 3D perspective simulation with five runs.



Keys of Roth

An adventurer in search of the keys, you must use your powers of deduction and determination to overcome the mysteries of the caverns. Orcs, trolls and the giant Jubjaroo are out to stop you in your quest.

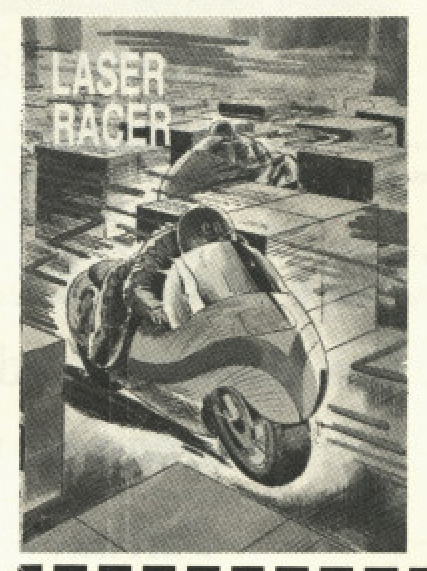


Handicap Golf

Bogeys, birdies, an albatross or par are all possible on this one- or two-player 18-hole handicap game. There are bunkers, lakes, trees, gorse bushes, the rough and gusting winds to be taken into account.

Laser Racer

Designed by Merlin software for Computer Rentals, Laser Racer puts you inside a huge computer. As the driver of a space-age laser racer, it is up to you to reach the computer's central processor and destroy it. Joystick or keyboard control.





St George and the Dragons

Slippery bridges and fire-breathing Dragons impede your progress as you attempt to steer the hapless saint across the screen to smite the magic stone and lift the curse from the castle and its maidens. Musical interludes accompany your failures. Joystick or keyboard control.

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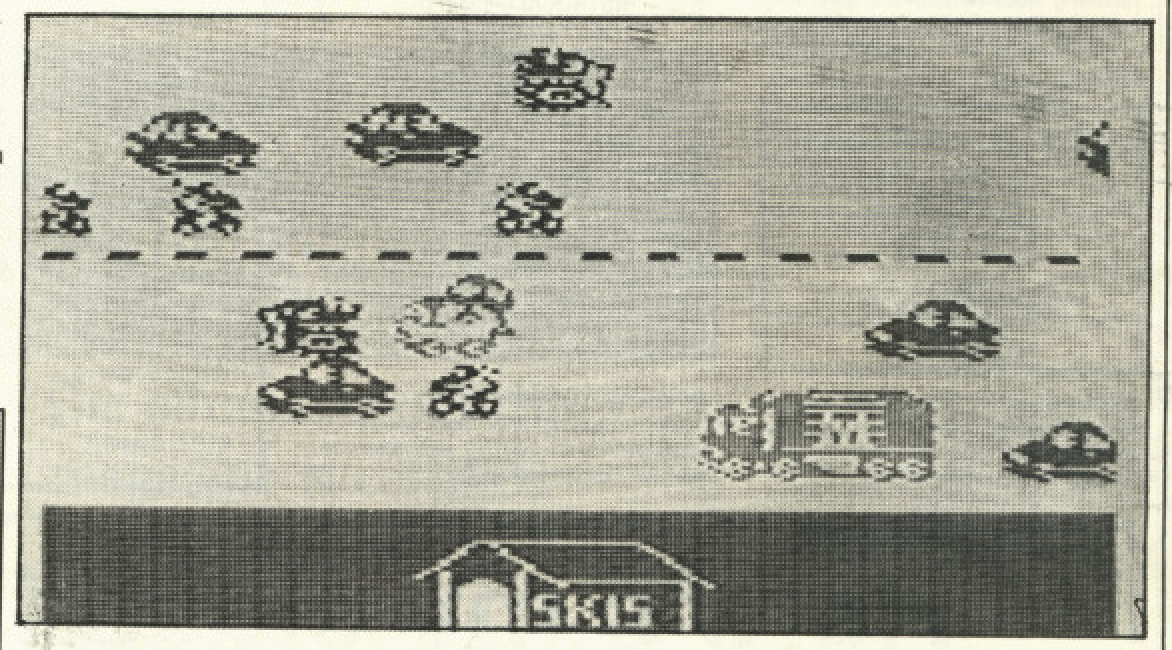
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Answers to Competition Corner, *Dragon User*, 12/13 Little Newport Street, London WC2R 3LD



Counting counters

*Melbourne House provides the prizes to **Gordon Lee's** historic puzzle*



THERE MUST be many of us, I'm sure, that have sat up late into the night with a tricky program on our Dragons, and who have found that on finally going to bed, sleep is denied us as the problem persists, in going round and round in our brains. If you have been so affected you may be surprised to hear that a similar problem was not unknown to one of the most well known figures in English literature just a century ago. That person was Lewis Carroll, and I hasten to add that is was not computer problems that were the cause of his insomnia, but mathematical riddles of a more general nature.

Lewis Carroll, the pen name under which the Reverend Charles Lutwidge Dodgson published his immortal childrens' classics, was also the author of more academic works on formal logic and Euclidean geometry. However, it is probably for his creation of such characters as the Cheshire Cat, Queen of Hearts, Mock Turtle and the Walrus and Carpenter, that he will be best remembered.

Photography

Educated at Rugby and Oxford, he entered Christ Church, Oxford in 1851 and was appointed lecturer in mathematics there in 1854. His other interests were in photography, then in its infancy, and in which he achieved a fair amount of notability and in the church — he was ordained a deacon in the Church of England in 1861.

In between the fantasy world of Alice in Wonderland — (just imagine what sort or computer adventures he could have written!) — and his mathematical works, he created a number of interesting collections of puzzles and diversions. These he assures us in the preface to the first edition of his *Pillow Problems*, were thought out while lying awake at night. Indeed, appended to many of the puzzles in this collection are the actual dates on which they were devised. For instance, on 8 September 1887 he invented the following curious problem:

"A bag contains two counters, as to which nothing is known except that each is either black or white. Ascertain their colours without taking them out of the bag."

He then proceeds, by a convoluted process of logic, to show that the bag must contain one black and one white counter. Perhaps this strange logic is to be expected from the creator of *Alice's Adventures in Wonderland.*

"Take some more tea," the March Hare said to Alice earnestly.

"I've had nothing yet," Alice replied in an offended tone: "So I can't take more."

"You mean you can't take *less,*" said the Hatter: "It's very easy to take *more* than nothing."

For this month's competition we are reproducing one of Lewis Carroll's puzzles — dated 4 March, 1880: There are three bags, each containing six counters; one contains five white and one black; another, four white and two black; the third, three white and three black. From two of the bags (it is not known which) a counter is drawn (one from each), and which proves to be one black and one white. **What is the chance of drawing a white counter from the remaining bag?**

Assume that Lewis Carroll had a computer and show how he might have used it to solve this problem.

Prize

MELBOURNE HOUSE is offering 30 readers a chance to win a copy of its sequel to Hungry Horace, Horace Goes Skiing (reviewed in the September issue of *Dragon User*).

Rules

THERE WERE TWO winners chosen from amongst the many entrants to the August Competition. The first prize winner is Adrian Tomison from Ebbw Vale who is the recipient of a DD500 dual disk drive system from Cumana. Second prize, the single drive equivalent, the DS250, has been won by Tom Jarvis of Spondon in Derby.

Both winners correctly stated that the keycode used was 498 to obtain the message: "CRACK/ THIS/ ON/ YOUR/ COMPUTER/ AND/ YOU/ MAY/ WIN/ THIS/ MONTH'S/ DRAGON/ USER/ COMPETITION."

August winners

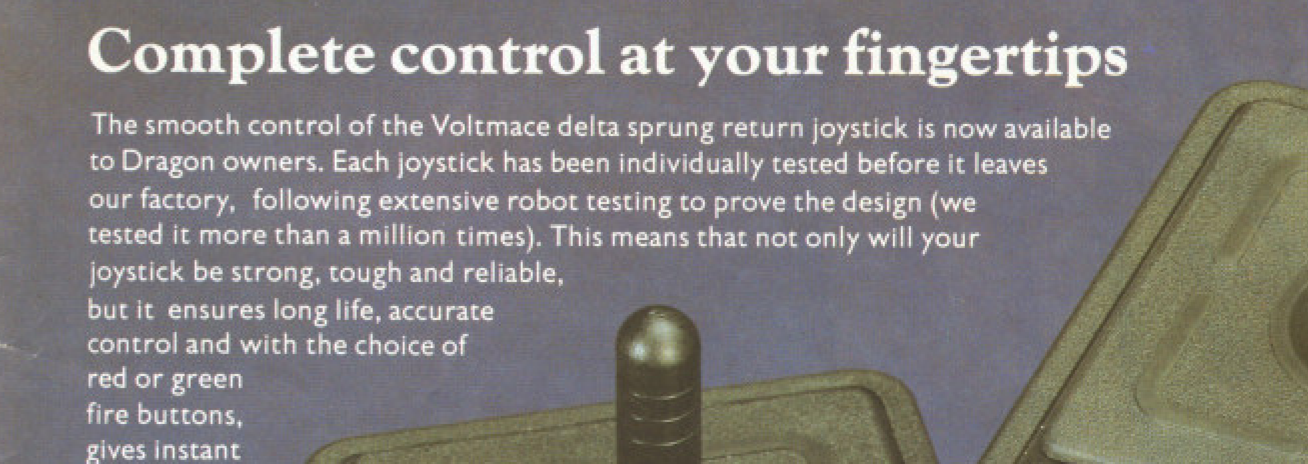
TO WIN a copy of the game you must show both the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon. Please do not send in a cassette containing the answer. As a tie-breaker complete the following sentence in 15 words or less: "I want to own a copy of Horace Goes Skiing because . . ."

Your entry must arrive at *Dragon User* by the last working day of November. The winners and the solution of the quiz will be published in our February issue. Entries will not be acknowledged and we cannot enter into correspondence on the restult. You may only enter the competiton once.

St. George now has two choices!

Red or green will slay the Dragon

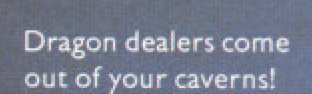
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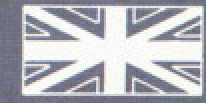
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